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PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS

VOL. XLIII—No. 6

August, 1917

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Vol. XLIII. AUGUST, 1917. No. 6.

AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed in its publications.

SOCIETY AFFAIRS

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MINUTES OF MEETINGS OF THE SOCIETY

May 16th, 1917.—The meeting was called to order at 8.30 P. M.; President George H. Pegram in the chair; Chas. Warren Hunt, Secretary; and present, also, 89 members and 8 guests.

A paper by J. F. Partridge, Jun. Am. Soc. C. E., entitled "Modern Practice in Wood Stave Pipe Design, and Suggestions for Standard Specifications", was presented by the Secretary, who also read communications on the subject from Messrs. H. von Schrenk, F. F. Bell, H. D. Coale, and D. C. Henny. The paper was discussed further by Messrs. Henry P. Rust, H. B. Machen, W. J. Boucher, and F. M. Robbins.

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The Secretary announced the election of the following candidates on May 15th, 1917:

As Members

Charles Rogy Burky, Jerome, Idaho
Albert Bennett Cudebec, New York City
Elmer Ellsworth Greenwood, Skowhegan, Me.
Henry Guttin, New York City
Harry Allardt Kluegel, Denver, Colo.
Lamar Lyndon, New York City
Hisanori Numata, Yawata-Machi, Chikuzen, Japan
Jacob Latch Warner, Wilmington, Del.
Ralph Nims Whitcomb, New York City

As Associate Members

Murray Chase Ayers, Pasadena, Cal.
William Earnest Baldry, Dodge City, Kans.
John Ralph Bogert, Wilkinsburg, Pa.
George Hathaway Canfield, Oakland, Cal.
Earl William Chamberlin, Chicago, Ill.
Joseph Brandly Converse, Montgomery, Ala.
Daniel Boyden Cutler, Tyler, Tex.
Lott Davis Draper, Germantown, Pa.
Arthur Hoyt Dunlap, Barstow, Tex.
Lester Fisher Ellis, Lexington, Mass.
Lambert Theodore Ericson, Toledo, Ohio
Chester McKenzie Everett, New York City
Rudolph Evers, Brooklyn, N. Y.
Alvin Bartholdi Fox, Perth Amboy, N. J.
Charles Grover Gabelman, Fort Mills, Philippine Islands
Leslie Drew Goddard, Ann Arbor, Mich.
William Robert Goodwin, Minneapolis, Minn.
Howard Allison Gray, West Somerville, Mass.
Clarence Saylor Gruetzmacher, Milwaukee, Wis.
Benjamin Mortimer Hall, Jr., Atlanta, Ga.
Aloysius Frank Harter, Phœnix, Ariz.
Eugene Robert Hoffman, Olympia, Wash.
Joseph Earl Huber, Mt. Vernon, Ill.
William Hill Hulsizer, Omaha, Nebr.
Hollister Johnson, Albany, N. Y.
Percival Charles Jones, Cleveland, Ohio
Robert Leroy Jones, Sacramento, Cal.
Gerald Sturtevant Kibbey, Minneapolis, Minn.
Paul Robert Kirstein, Cincinnati, Ohio
Enno Paul Knollman, Columbus, Ohio

ADONIS WILLIAM KREAMER, Wheeling, W. Va.
EDWARD ALLYN LAMBERT, Bridgeport, Conn.
ARTHUR LEWIS LAROCHE, Binghamton, N. Y.
MORGAN FOSTER LARSON, Perth Amboy, N. J.
PERCIVAL JOHN MACNAUGHTON, Springfield, Mass.
WILLIAM OLIVER MCCLUSKEY, JR., Wheeling, W. Va.
HYMAN HARRY MANDELZWEIG, Cleveland, Ohio
WILLIAM CHRISTIAN MILLER, Sycamore, Ill.
JAMES SHIVELY NEIBERT, Liberty, Tex.
GEORGE FRANCES NICHOLSON, Seattle, Wash.
ALBERT ROY OLDS, Havana, Cuba
FRANK HUGH O'ROURKE, Sellersville, Pa.
EDMUND ADDISON PRATT, Philadelphia, Pa.
MAURICE JAMES QUINN, Detroit, Mich.
CHARLES RAMSAY RINEHART, New York City
WILBERT ROBIN ROSCHE, Pueblo, Colo.
CHARLES CHRISTIAN SCHARPENBERG, Bakersfield, Cal.
JAMES HILTON SHERMAN, Kansas City, Mo.
ELMER SIGLER, Kansas City, Mo.
ISAAC CLEVELAND STEELE, Alameda, Cal.
OTTO CHRISTIAN TRETTEN, San Luis Obispo, Cal.
WILLIAM CLAUDE TYSON, Little Rock, Ark.
THOMAS ALBERT VAN AMBURGH, Oklahoma, Okla.
CLAUDE LINN VAN AUKEN, Chicago, Ill.
GEORGE PARKER VAN VLIET, Cincinnati, Ohio
LESTER CARL WALKER, Richfield, Idaho
HERBERT KIRKMAN WARD, San Diego, Cal.
LEE GILBERT WARREN, Milwaukee, Wis.
HARRY ARTEMAS WELLS, Hanover, N. H.
HERBERT JAMES WRIGHT, Philadelphia, Pa.

AS JUNIORS

WALTER DAVID BINGER, New York City
JAMES DEWITT BOHLKEN, Blacksburg, Va.
ARTHUR TAYLOR BRAGONIER, Roanoke, Va.
JOHN BERNARD BREYMANN, JR., Toledo, Ohio
SIMON BRICKLIN, Philadelphia, Pa.
CLARENCE CONDON DUSTHEIMER, Cristobal, Canal Zone, Panama
AARON HERBERT FRANK, Utica, N. Y.
ROLAND RUSSELL GRAHAM, Elmira, N. Y.
BERNARD HENRY GREHAN, New Orleans, La.
HARRY NEVILLE JENKS, Berkeley, Cal.
GEORGE SEYMOUR MCCULLOUGH, Evanston, Ill.
THOMAS CHARLES MORGAN, Brooklyn, N. Y.
DAVID NABOW, Charlotte, N. C.

WILLIAM HENRI FRANCAIS AUGUST POCKELS, Buenos Aires, Argentine Republic
FREDERIC BORRADAILE PRICHETT, Philadelphia, Pa.
GEORGE FRANCIS SEXTON, New York City
WILLIAM EDWARD SHEA, Remedios, Cuba
WALTER RAYMOND WEBER, Denver, Colo.

The Secretary announced the transfer of the following candidates on May 15th, 1917:

FROM ASSOCIATE MEMBER TO MEMBER

FARRAND NORTHROP BENEDICT, East Orange, N. J.
CLARENCE MOORE BLAIR, New Haven, Conn.
GUSTAVE MAURICE BRAUNE, Cincinnati, Ohio
FREDERICK CHARLES CARSTARPHEN, Trenton, N. J.
JOHN PERCIVAL DAVIES, New York City
FARLEY GANNETT, Harrisburg, Pa.
OTTO HENRY GENTNER, JR., Philadelphia, Pa.
SAMUEL ROWLAND GINSBURG, La Romana, Dominican Republic
OLIVER ZELL HOWARD, Lawrence, Mass.
JOHN NATHANIEL MACKALL, Harrisburg, Pa.
WILLIAM HALE PHILLIPS, Spokane, Wash.
REX CAMERON STARR, Los Angeles, Cal.

FROM JUNIOR TO ASSOCIATE MEMBER

CHESTER ELY ATWOOD, Valier, Mont.
WILBUR EARL BICKERTON, Baltimore, Md.
GUY HERSEY BISHOP, Oelwein, Iowa
FRANK LEONARD BOLTON, Erie, Pa.
EDOUARD JEAN BERNARD DE MEY, Pittsburgh, Pa.
HAROLD LEWIS ENGLISH, Washington, D. C.
WILLIAM WETMORE GIBBS, Nichols, Fla.
EWING SLOAN HUMPHREYS, Richmond, Va.
ERNST GUSTAV KAUFMANN, Buffalo, N. Y.
JOHN BRUCE MAILEY, Lynn, Mass.
CLIFFORD EATON MURRAY, Newark, N. J.
ERNEST BENJAMIN NELSON, Chañaral, Chile
KINGSBURY EASTMAN PARKER, San Francisco, Cal.
JOHN JOSEPH FRANCIS PHALAN, Utica, N. Y.
CHARLES LYSANDER RAKESTRAW, San Francisco, Cal.
HAROLD AUGUST HASTRUP SCHULTZ, Detroit, Mich.
VALERIANO SEGURA, Manila, Philippine Islands
MINTON MACHADO WARREN, Cambridge, Mass.
MAURICE ANDERSON WEBSTER, Philadelphia, Pa.

The Secretary announced the following deaths:

STANLEY ALFRED MILLER, of Paducah, Ky., elected Junior, February 4th, 1902; Associate Member, April 6th, 1909; Member, June 24th, 1916; died May 13th, 1917.

DAVID SIMSON, of Hitchin, Herts, England, elected Member, January 8th, 1902; died December 16th, 1916.

JOHN HATFIELD FRAZEE, of New York City, elected Associate Member, December 6th, 1899; died May 4th, 1917.

LEWIS ROBERTS POMEROY, of Orange, N. J., elected Associate, April 2d, 1890; died May 7th, 1917.

Adjourned.

June 6th, 1917.—The meeting was called to order at 8.30 P. M.; President George H. Pegram in the chair; Chas. Warren Hunt, Secretary; and present, also, 196 members and 43 guests.

The minutes of the meetings of April 18th and May 2d, 1917, were approved as printed in *Proceedings* for May, 1917.

E. F. Robinson, Assoc. M. Am. Soc. C. E., Captain, Corps of Engrs., N. G. N. Y., addressed the meeting on "The Work of the 22d N. Y. Engineers on the Mexican Border", illustrating his remarks with lantern slides, and J. H. Granbery, M. Am. Soc. C. E., exhibited French and German helmets, gas masks, and other military accoutrements from the French front at Verdun.

The Secretary read a communication from J. H. Gandolfo, Assoc. M. Am. Soc. C. E., announcing the establishment of an evening section of a course of theoretical and practical instruction in military subjects by the College of the City of New York, during the summer.

The Secretary announced the following deaths:

JAMES WALTER GRIMSHAW, of Westminster, London, England, elected Member, November 7th, 1888; died February 15th, 1917.

FRANKLIN BUCHANAN LOCKE, of North Adams, Mass., elected Member, March 1st, 1893; died May 11th, 1917.

Adjourned.

ELECTIONS AND TRANSFERS BY THE BOARD OF DIRECTION, JUNE 11th-12th, 1917.

ELECTED AS MEMBERS

LYONEL AYRES, Duluth, Minn.
ALFRED WILLIAM BOWIE, New York City
MALCOLM COLBURN CLEVELAND, New York City
WILLIAM CANTRILL CURD, St. Louis, Mo.
DAVID SMITH GENDELL, JR., Pottstown, Pa.
PAUL ANTHONY TROST, West Hoboken, N. J.

ELECTED AS ASSOCIATE MEMBERS

RAYMOND ASHTON, San Francisco, Cal.
FREDERICK ANDREW BAKER, Bogalusa, La.
WILBUR VICK BANISTER, Boston, Mass.
JOHN ROBERT BIEDINGER, Cincinnati, Ohio
ROBERT LAWTON BOWEN, Providence, R. I.
ROBERT PLATT BOYD, Monroe, La.
ROBERT WESLEY BRIGGS, Yonkers, N. Y.
JOHN HENRY BROWN, JR., Philadelphia, Pa.
CHARLES HOMER BUFORD, Chicago, Ill.
ISAAC JACQUES CASEY, JR., Irvington, N. J.
JOHN HIRST CATON, 3d, Providence, R. I.
CHARLES WALTER CHAPIN, San Luis Obispo, Cal.
FRANCIS DORSEY CHRISTHILF, Baltimore, Md.
GEORGE PHELPS CLAYSON, Chicago, Ill.
WILLIAM HENRY COURTENAY, Philadelphia, Pa.
JAMES CRESSON, Norristown, Pa.
PERRY AUGUSTUS FELLOWS, Ann Arbor, Mich.
CLARENCE STEPHENS GALE, Easton, Md.
FRANKLIN JOSEPH HANMER, North Milwaukee, Wis.
NEAL HANSON, Ute Park, N. Mex.
WELLINGTON PRESCOTT HEWS, San Francisco, Cal.
ARTHUR JULIUS KNIGHT, Worcester, Mass.
LYMAN CALVIN LAMB, Youngstown, Ohio
HENRY LLOYD, Cheyenne, Wyo.
CHARLES EDWARD MACLEAN, Boise, Idaho
CHARLES ALLEN MERRIAM, Portland, Ore.
JOHN EARL MORELOCK, Chattanooga, Tenn.
THOMAS PRESTON PAXTON, Okmulgee, Okla.
WILLIAM CLAY PENN, Alcoa, Tenn.
VICTOR SMITH PERSONS, San Francisco, Cal.
PERCY LAWRENCE REED, Philadelphia, Pa.
WILLIAM CATHCART RIDDLE, Harrisburg, Pa.
ANDREW FRANCIS ROSS, Powell, Wyo.
LEWIS PELOT SCOTT, Aurora, Ill.
GEORGE MILSON SHEPARD, Minneapolis, Minn.
EUGENE ADALBERT SILAGI, Columbus, Ohio
JOHN WILLIAM SWAREN, Hayward, Cal.
ROCK GRANITE TABER, Dallas, Tex.
LOUIS EARLE THORNTON, Pensacola, Fla.
FRANK KLINE WEBB, New Orleans, La.

ELECTED AS JUNIORS

ROY LEONARD ANDERSON, West Berkeley, Cal.
ALFRED ANDREW BURGER, Akron, Ohio

Charles Michael Carnelli, New York City
Daniel Warwick Colhoun, New York City
Alden Wales Harvey, Coatesville, Pa.
Alfred John Mahnken, Weehawken, N. J.
Arthur Clough Nichols, Knoxville, Tenn.
George Anton Repko, Queens, N. Y.
Leo Francis Reynolds, St. Joseph, Mo.
Fonzie Eugene Robertson, Dallas, Tex.
William Lewis Stanton, Los Angeles, Cal.
William Robert Swanson, Chicago, Ill.
Charles Laurence Warwick, Narberth, Pa.

Transferred from Associate Member to Member

Joseph Chester Allison, Calexico, Cal.
Charles Terrell Bartlett, San Antonio, Tex.
Percy Lewis Braunworth, Montclair, N. J.
Charles Franklin Brown, Salt Lake City, Utah
John Richard Cahill, San Francisco, Cal.
Edwin Keen Cortright, Lawrence, Mass.
George Cromwell, San Diego, Cal.
William Earle Elam, Greenville, Miss.
Henry Dievendorf Dewell, San Francisco, Cal.
William Dewoody Dickinson, Little Rock, Ark.
Franklin Edward Estes, Petersburg, Fla.
Harry Carter Gardner, Lancaster, Pa.
Albert Wesley Gaumer, Santiago de Cuba, Cuba
Howard Howell George, Newark, N. J.
Trygve Daniel Bödtker Groner, Springfield, Ohio
Charles Newton Green, New York City
Samuel Whilden Henderson, Excelsior Springs, Mo.
Clarence Decatur Howe, Port Arthur, Ont., Canada
Walter Leroy Huber, San Francisco, Cal.
Hinman Barrett Hurlbut, Washington, D. C.
Willis Ranney, San Antonio, Tex.
Richard Wood Randolph, Ichang, China
John Marie Thomas Rice, Pittsburgh, Pa.
Percy Augustus Shaw, Lancaster, Pa.
Thomas Shackelford Shepperd, Pittsburgh, Pa.
Walter James Spalding, Ancon, Canal Zone, Panama
Adolphus Gustavus Trost, El Paso, Tex.
Hubert Southwick Tullock, Leavenworth, Kans.
Guy Anderson Watkins, Little Rock, Ark.
Maurice William Williams, Albany, N. Y.
William Horace Williams, New Orleans, La.

TRANSFERRED FROM JUNIOR TO ASSOCIATE MEMBER

RICHARD HENDERSON EURICH, Montclair, N. J.
FRED DAILEY HARTFORD, Denver, Colo.
JOSÉ JUSTO MANZANILLA Y CARBONELL, Havana, Cuba
CHARLES ERNEST RAMSER, Washington, D. C.
NEIL THOM, JR., San Francisco, Cal.
JOHN MALCOLM WALLER, Kansas City, Mo.
GEORGE LELAND YOUMANS, Tacoma, Wash.

OF THE BOARD OF DIRECTION

(Abstract)

May 15th, 1917.—The Board met at 10.30 P. M., immediately after the adjournment of the Membership Committee; President Pegram in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Davies, Fay, Flinn, Humphreys, Kittredge, and Noble.

Ballots for membership were canvassed, resulting in the election of 9 Members, 60 Associate Members, and 18 Juniors, and the transfer of 19 Juniors to the grade of Associate Member.

Twelve Associate Members were transferred to the grade of Member.

A Report from the Membership Committee was received and acted upon.

Adjourned.

SOCIETY ITEMS OF INTEREST

Letter from the United States Coast and Geodetic Survey

"WASHINGTON, D. C., June 5, 1917.

"DR. CHARLES WARREN HUNT,
Secretary, American Society of Civil Engineers,
New York, N. Y.

"DEAR SIR.—I am sending you herewith a copy of the bill recently passed by Congress which includes an item of vital interest to the Coast and Geodetic Survey.

"It authorized the President to turn over to the War or to the Navy Department, in time of war, any part of the equipment or personnel of the Survey that he may think advisable for the national defense and offense.

"The bill also provides that any of the personnel assigned to duty in the War or Navy Department shall have proper military status. The status of the engineers of the Survey is provided for in the bill.

"An item of the greatest importance, not only to this bureau but to civil engineers throughout the country, is the provision that the field engineers, who will be called hereafter hydrographic and geodetic engineers and junior hydrographic and geodetic engineers, and aids, are to be appointed or commissioned by the President of the United States, with the advice and consent of the Senate.

"Those persons in the Survey who have had the title of Assistant and of Aid have already been commissioned by the President and these commissions have been confirmed by the Senate.

"It is believed that the passage of the bill referred to is a recognition of the engineering profession by the federal government which is most gratifying. I feel that you will be glad to bring this action of the Government to the attention of the Board of the American Society of Civil Engineers, for their information.

"Very truly yours,
"R. L. FARIS,
"Acting Superintendent."

The Award of the John Fritz Medal for 1917

The John Fritz Medal for 1917, awarded to Dr. Henry M. Howe for his "investigations in metallurgy, especially in the metallography of iron and steel", was presented in the Auditorium of the United Engineering Society's Building, New York City, on Thursday evening, May 10th, 1917.

Mr. Ambrose Swasey, Chairman of the John Fritz Medal Board of Award, presided, and addresses were delivered by Dr. Rossiter W. Raymond, Secretary Emeritus of the American Institute of Mining Engineers, and Dr. Ira N. Hollis, President of the American Society of Mechanical Engineers.

Professor Albert Sauveur, Chairman of the Board at the time the award was made, presented the medal, and the ceremonies concluded with the response of Dr. Howe.

LIST OF RECIPIENTS OF THE JOHN FRITZ MEDAL.

John Fritz.....1902
Lord Kelvin.....1905
George Westinghouse.....1906
Alexander Graham Bell.....1907
Thomas Alva Edison.....1908
Charles Talbot Porter.....1909
Alfred Noble.....1910
Sir William Henry White..1911
Robert Woolston Hunt.....1912
John Edson Sweet.....1914
James Douglas.....1915
Elihu Thomson.....1916
Henry Marion Howe.....1917

Report of the Committee on Special Committees Presented to the Board of Direction, June 11th, 1917, and Ordered Printed for the Information of Members

30 CHURCH STREET, NEW YORK,
June 5, 1917.

THE BOARD OF DIRECTION,
AMERICAN SOCIETY OF CIVIL ENGINEERS,
New York, N. Y.

GENTLEMEN.—At your last meeting, April 17th, 1917, you referred to the Committee on Special Committees two matters for investigation and report, regarding which we beg to submit the following report:

1.—Request for the Appointment of a New Special Committee on Concrete and Reinforced Concrete.

We have given careful consideration to the possible advantages to the Society of continuing the Special Committee on Concrete and Reinforced Concrete or of the appointment of a new Special Committee. Since the date of the recent report there is nothing new in the art which would warrant continuing the old, or appointing a new, Special Committee to continue the work beyond the scope of the final report which was presented in January. There is no warrant under our Constitution for maintaining a Special Committee perpetually to watch developments in any particular branch of the art of engineering.

Our recommendation is that no such Special Committee should be continued nor new Special Committee appointed. In the future, when

there shall have been some further advance in the use of concrete and reinforced concrete sufficient to warrant a further study and report on the subject, the appointment of a Special Committee can be considered on its merits.

2.—Request for the Appointment of a Special Committee of Five Members to Investigate and Report on the Conditions and Opportunities for American Engineers in Russia and in South America.

Article VI, Section 12, of the Constitution of the Society, provides that, "Special committees to report upon engineering subjects shall be authorized, except as further provided in this paragraph", etc. In our opinion, the matter of investigating the conditions and opportunities for American Engineers in Russia and in South America does not come within the scope of the meaning of "engineering subjects", and we, therefore, recommend against the appointment of such a Committee as is requested.

In submitting this report, we beg to state that while it is not signed by Mr. W. L. Darling, a member of the Committee on Special Committees, the recommendations herein made are fully concurred in by him. The absence of Mr. Darling's signature hereto is due to his leaving this country on government business prior to the report being written.

Committee on Special Committees.
J. V. DAVIES, *Chairman.*
GEO. W. TILLSON.

Contingent Fees

The following letter, relating to contingent fees, was presented to the Board of Direction at its meeting on June 11th, 1917, and was ordered printed for the information of the membership.

"NEW ORLEANS, LA.
"May 29th, 1917.

"TO THE BOARD OF DIRECTION,
AMERICAN SOCIETY OF CIVIL ENGINEERS,
220 WEST 57TH ST., NEW YORK.

"GENTLEMEN.—Referring to the correspondence published in the May number of *Proceedings** in regard to the acceptance by engineers of a contingent fee, it would appear to the writer that this subject is of sufficient importance to justify further discussion, extending into fields other than service as an expert witness in Court. It may first, however, be proper to express a hearty agreement with the reply given by Mr. Clemens Herschel to the inquiry of Mr. J. H. Quinton as regards testimony given in Court. Our profession is in no position

* *Proceedings*, Am. Soc. C. E., May, 1917, p. 332.

to regulate the operation of our law Courts, but we can at least apply to our service in connection with those Courts the ideals which we stand for in our other relations. In most trials in American Courts, the attorneys are not serving as a semi-official part of the Court, but as violent partisans, striving, by every means which their code of ethics will permit, to secure an advantage for their particular client. The net result is that the side which employs the preponderance of ability secures the preponderance of advantage, especially in trials by jury and in the lower Courts. To offset, as much as may be practicable, this generally admitted pernicious practice, it would appear to be the duty of a member of our profession, when employed as an expert witness, to adopt the attitude that he is employed by the Court (though of necessity in some States paid by the client) to assist in arriving at the truth. Owing to the fact that this attitude has not been fixed by precedent long followed by all professions, the engineer's position might well be stated to the client or his attorney before accepting employment.

"The writer has occasionally found practicing attorneys who have so departed from the usual custom of their profession that, in the handling of some peculiar case, the technical details of which are not fully covered by their own experience, they will call in the services of some specialist in that line for assistance in the preparation of their brief, and more especially in the preparation of questions to be asked the witnesses. In such a case, the writer can see no objection to the engineer taking a partisan attitude, for he is then an assistant to the attorney and not to the Court. The question of a contingent fee under such circumstances might be judged more from a business than from an ethical standpoint.

"The average man who maintains a general engineering office is probably more often requested to render services for a contingent fee in connection with a new project requiring an examination and a report than for service as an expert witness in Court. This office has had an average of not less than four such cases offered per year for the past several years. Such proposals have been uniformly rejected for the following reasons:

"1.—Handling of engineering work on a contingent fee is considered to be poor business policy.

"2.—It is considered to be unethical.

"Considering these points in the order named, established custom prevents an engineer from charging a fee commensurate with the risks involved. Judged by the rule of averages, he would have to provide for a probable failure of the project (and consequent failure to collect his fee) in at least one-half the cases so handled. On all lost cases, he would be out, not only his own time, but also for expenses incurred. In many instances, these expenses run up into an amount which the average engineer is in no position to lose.

"As regards the ethical questions involved, assume that the engineer is employed to make an examination, survey, and report on a projected interurban railway. Acting in the capacity in which he is employed, he is not only charged with the duty of securing such information

as is desired by the promoters of the scheme, but, in a certain broad sense, he is the representative of all parties concerned. These parties are numerous, such as the promoters themselves, the future stockholders, and bondholders, the future patrons of the road, and all interests which might be affected by its construction and operation. Serving in such a capacity, the work of an engineer is, or should be, exceptionally judicial in its character. The engineer may be able to satisfy himself that his report will be in no way colored, modified, or exaggerated by the fact that the payment of his fee is contingent on the successful financing of the project, but human nature is weak, and even though he may satisfy his own conscience in the matter, the engineer may not always be able to satisfy the public, and more especially the canny investor, that he has been entirely unbiased in his presentation of the case, when it is known that it has been accepted on a contingent fee.

"The foregoing applies more particularly to the preparation of original plans and reports. After a project has been financed, no objection can be seen to the engineer accepting an administrative or other position in the concern, accepting in return payment or part payment in stock or profits, this again being more a matter of business than of ethics. It is obvious, however, that, in connecting himself with a project as part owner, the engineer may not consistently clothe himself with such broad powers over contractors who may be employed as is customarily done by engineers who take the position that they are unbiased arbitrators as between the owners and contractors. An attempt to lay down rules, however, for all such combinations of circumstances, would lead logically to a regulation in minute detail of all the acts of the individual, a procedure which is neither possible nor desirable. The only safe rule to apply is the Golden Rule, on which are based the generally accepted code of ethics of our profession.

"Respectfully submitted

"ARTHUR M. SHAW,

"Member, Am. Soc. C. E."

Proposed Revision of the Constitution

Referring to the note on page 315* with regard to the action of the Board in the matter of the proposed revision of the Constitution, the following facts should be noted:

The Report received by the Board was from a Committee consisting of M. T. Endicott, Chairman, J. A. Ockerson, George F. Swain, Hunter McDonald, J. V. Davies, H. S. Crocker, and Chas. Warren Hunt, and was not unanimous, the only difference of opinion in the Committee being as to whether the Secretary of the Society should be a member of the Board of Direction or not, Messrs. Endicott, Ockerson, McDonald, and Davies, holding that he should not be, and Messrs. Swain, Crocker, and Hunt, that he should be.

It should also be stated that the proposed By-laws are not intended to be passed upon by vote of the Society. They are published with the

* *Proceedings*, Am. Soc. C. E., May, 1917.

proposed Constitution, which is to be voted upon, for the information of the membership. Should a new Constitution be adopted, these By-laws will be subject to change or amplification by the Board of Direction.

Bill for the Licensing of Engineers Adopted by the State Legislature of Florida

This bill was adopted by the Senate of the State Legislature of Florida on May 17th, 1917, and by the House on the following day. A copy of the bill was forwarded to the Society by A. F. Harley, M. Am. Soc. C. E., and is here printed for the information of the membership.

AN ACT PROVIDING FOR THE CREATION AND ESTABLISHMENT OF A FLORIDA STATE BOARD OF ENGINEERING EXAMINERS, GRANTING CERTAIN POWERS TO AND PRESCRIBING THE DUTIES OF SAID BOARD; PROVIDING FOR THE EXAMINATION AND REGISTRATION OF PROFESSIONAL ENGINEERS, REGULATING THE PRACTICE OF ENGINEERING IN THE STATE OF FLORIDA, AND PROVIDING PENALTIES FOR THE VIOLATION OF THIS ACT.

Be It Enacted by the Legislature of the State of Florida:

SECTION 1. Definitions. As used in this Act:

(a) The "Board" means the State Board of Engineering Examiners provided for by this Act.

(b) A person practices "Professional Engineering" within the meaning of this Act who practices any branch of the profession of engineering other than military engineering. The practice of said profession embraces the design and the supervision of the construction of public and private utilities, such as railroads, bridges, highways, roads, canals, harbors, river improvements, lighthouses, wet docks, dry docks, ships, barges, dredges, cranes, floating docks and other floating property, the design and the supervision of the construction of steam engines, turbines, internal combustion engines and other mechanical structures, electrical machinery and apparatus, and of works for the development, transmission or application of power, the design and the supervision of mining operations and of processes and apparatus for carrying out such operations, and the design and the supervision of the construction of municipal works, irrigation works, water supply works, sewerage works, drainage works, industrial works, sanitary works, hydraulic works and structural works and other public or private utilities or works which require for their design or the supervision of their construction such experience and technical knowledge as are required in Section 8 of this Act for admission to examination. The execution as a contractor of work designed by a professional engineer or the supervision of the construction of such work as a foreman or superintendent for such a contractor shall not be deemed to be the practice of professional engineering within the meaning of this Act; nor shall this Act apply to a person acting as a public officer employed by the State, a County or a Municipality of this State on work where the estimated cost of the same is $1 000.00 or less.

(c) "Professional Engineer" means any person who practices professional engineering.

SEC. 2. After the first day of January, nineteen hundred and eighteen, no person shall practice professional engineering without having first been duly and regularly registered by the Board as a professional engineer as required by this Act, nor shall any person practice professional engineering whose authority to practice is revoked by the Board; and after the first day of January, nineteen hundred and eighteen, every map, plan and drawing required by law to be certified or approved by a professional engineer shall be certified or approved by a professional engineer duly and regularly registered by the Board as a professional engineer as required by this Act and shall bear the date and the number of the certificate of registration of such professional engineer.

SEC. 3. There shall be a State Board of Engineering Examiners consisting of five members to be appointed by the Governor, three of whom shall be civil engineers, one a mining or electrical engineer, and the other one a mechanical engineer or naval architect. Of the members of the Board first appointed hereunder two shall hold office for a term of two years ending the first day of July, nineteen hundred and nineteen. Two shall hold office for a term of three years ending the first day of July, nineteen hundred and twenty. One shall hold office for a term of four years ending the first day of July, nineteen hundred and twenty-one. The term of office of each member so appointed shall begin on the first day of July, nineteen hundred and seventeen. Upon the expiration of each of such terms the term of office of each member thereafter appointed shall be four years. Each member shall hold over after the expiration of his term until his successor shall be duly appointed and qualified. The Governor may remove any member of the Board for misconduct, incapacity or neglect of duty. Vacancies in the Board caused by death, resignation or removal from office shall be filled by appointment by the Governor for the unexpired term. Each member of the Board shall be a professional engineer of at least ten years active experience and of recognized good standing in his profession and shall be at least thirty-five years of age and shall have been a resident of this state for at least three years immediately preceding his appointment. Each member of said Board, except the members first appointed hereunder, shall also be registered as a professional engineer under this Act, and be also a member in good standing of a recognized engineering society. The members of the Board shall serve without compensation except traveling and other necessary expenses.

SEC. 4. Every member of the Board shall receive a certificate of his appointment from the Governor and before beginning his term of office shall file with the Secretary of State his written oath for the faithful discharge of his official duty. Each member of the Board first appointed hereunder shall receive a certificate of registration under this Act from said Board. The Board shall adopt and have an official seal. The Board may make all by-laws and rules not inconsistent with law needed in performing its duties; but no by-law or rule by which more than a majority vote is required for any specified action

by the Board shall be amended, suspended or repealed by a smaller vote than that required for action thereunder.

SEC. 5. The Board shall biennially elect from its members a president, a vice-president and a secretary who shall also be treasurer, for the ensuing biennial term. The Secretary shall give a bond in such amount and with such sureties as may be approved by the Board conditioned upon the faithful performance of his duties and for the accounting for, and payment of, all moneys received by him. The Secretary shall keep on file a record of all certificates of registration issued, and he shall receive and account for all fees derived from the operation of this Act.

The Board shall hold at least two regular meetings in each year. Special meetings may be called in such manner as the by-laws of the Board may provide. Notice of all meetings shall be given in such manner as the by-laws of the Board may provide. At all meetings a majority of the Board shall constitute a quorum.

SEC. 6. The Board shall have power to employ, during its pleasure, such clerks and other employees and to rent such offices as may be necessary for the proper performance by it of its duties as in this Act prescribed.

SEC. 7. The expenses of the Board and of the examinations held by the Board and of any other matter in connection with the provisions of this Act shall be paid from the registration fees collected as herein provided and not otherwise and in no case shall any of such expenses be paid by the State of Florida nor be charged against said State.

The members of the Board shall be entitled to reimbursement for their traveling and hotel expenses incurred in pursuance of their duties.

Any surplus funds remaining in the hands of the Board or of its Secretary and Treasurer shall be subject from time to time to the further provisions of the Legislature.

SEC. 8. The Board shall admit to examination any candidate who pays a fee of Fifteen Dollars ($15.00) and submits evidence, verified by oath and satisfactory to the Board, that he

(a) Is more than twenty-one years of age,
(b) Is of good character, and
(c) Has been engaged upon engineering work for at least six years and during that period has had charge of engineering work, as principal or assistant, for at least one year;
(d) Or, in lieu of requirement (c) specified above, is a graduate from an engineering school of recognized good reputation and has been engaged upon engineering work for at least four years and during that period has had charge of engineering work, as principal or assistant, for at least one year.

SEC. 9. Examinations for registration shall be held at regular or special meetings of the Board at such times and at such places within the State in each year as the Board shall determine. The scope of the examinations and the methods of procedure shall be prescribed by the Board. The examination may be either oral or partly oral and partly written. As soon as practicable after the close of each examination

the members of the Board who shall have conducted such examination shall make and sign and file with the Secretary a certificate stating the action of the Board upon the application of each candidate, whereupon the Secretary of the Board shall notify each candidate of the result of his examination.

SEC. 10. Upon receipt of an additional fee of Ten Dollars ($10.00) the Board shall issue to any applicant who has been certified as having passed the examination conducted by the Board a certificate of registration signed by the President and Secretary of the Board under the seal of the Board, whereupon each applicant shall be authorized to practice professional engineering as defined by this Act.

The Board shall from time to time examine the requirements for the registration of professional engineers in other States, territories and countries and shall record those in which, in the judgment of the Board, standards not lower than those provided by this Act are maintained. The Secretary of the Board, upon the presentation to him by any person of satisfactory evidence that such person holds a certificate of registration issued to such person by proper authority in any such State, territory or country so recorded and upon receipt by him of a fee of Twenty-five dollars ($25.00), shall issue to such person a certificate of registration under this Act, signed by the President and Secretary under the seal of the Board, whereupon the person to whom such certificate is issued shall be entitled to all the rights and privileges conferred by a certificate issued after examination by the Board.

SEC. 11. The Board shall at any time on or before the thirty-first day of December, nineteen hundred and seventeen, issue a certificate of registration signed by the President and the Secretary of the Board under the seal of the Board, upon due application therefor and the payment of a fee of Twenty-five Dollars ($25.00), to any professional engineer who shall submit evidence, verified by oath and satisfactory to the Board, that he is of good character and has been a resident of the State of Florida for at least one year immediately preceding the date of his application, and has practiced professional engineering for at least ten years preceding the date of his application and during that period has had charge of engineering work as principal or assistant for at least two years. After the thirty-first day of December, nineteen hundred and seventeen, the Board shall issue certificates of registration only as herein provided.

SEC. 12. All certificates of registration issued by the Board and its Secretary shall be in such form as the by-laws of the Board may prescribe. Before any certificate of registration is issued by the Board and its Secretary, it shall be numbered and recorded in a book kept for that purpose with the Secretary and the number of the certificate shall be noted on the certificate. Such record shall be open to public inspection and in all actions or proceedings in any court such record or a transcript of any part thereof certified by the Secretary of the Board under the seal of the Board to be a true copy shall be entitled to admission in evidence.

The Board shall have power at any time to inquire into the identity of any person claiming to be a registered professional engineer and after due service of a notice in writing, require him to prove to the satisfaction of the Board, that he is the person authorized to practice

professional engineering under the certificate of registration by virtue of which he claims the privilege of this Act.

When the Board finds that a person claiming to be a professional engineer registered under this Act is not in fact the person to whom the certificate of registration was issued, it shall reduce its findings to writing and file them in its office. Such findings shall be prima facie evidence that the person mentioned therein is falsely impersonating a professional engineer of a like or different name.

The Board may revoke a certificate of registration of a professional engineer for fraud or deceit in the securing of his certificate or for the conviction of crime. Proceedings for the revocation of a certificate of registration shall be begun by filing with the Board a written charge or charges against the accused. These charges may be preferred by any person or corporation or the Board may on its own motion direct its Secretary to prefer such charges. When charges are preferred against a professional engineer, registered under the provisions of this Act, the Board shall designate not less than three of its number as a committee to hear and determine said charges. A time and place for the hearing shall be fixed by said committee and a copy of the charges, together with a notice of the time and place for the hearing, shall be served upon the accused or his counsel at least ten days before the date fixed for said hearing. Where personal service or service upon counsel cannot be effected and such fact is certified on oath by any person duly authorized to make legal service, the Board shall cause to be published for at least five times, the first publication to be at least thirty days prior to the hearing, in two newspapers published in the section of the State in which the accused was last known to practice, a notice to the effect that at a definite time and place a hearing will be held on the charges against the accused upon an application to revoke his certificate. At said hearing the accused shall have the right to cross-examine witnesses against him and produce witnesses in his defense and to appear personally or by counsel. The said committee shall make a written report of its findings and recommendations and shall forthwith submit the same to the Board. If the Board shall sustain the findings of the committee and it is the decision of the Board that said certificate should be revoked the Board shall thereupon give written notice to the said professional engineer against whom the charges are preferred of its intention so to do, whereupon the said professional engineer against whom said charges have been preferred shall have the right within sixty days to appeal to any court in equity or law, having proper jurisdiction, against the action of the said Board and the action of the Board shall be subject to review and decision of said court, or of a higher court, if appeal is taken. In the event that the said professional engineer against whom charges have been preferred shall not within sixty days appeal from the decision of the Board in the manner above provided, the Board shall have the power and authority to thereupon, or as soon thereafter as practicable, annul and revoke the said certificate of registration. The action of the Board shall be recorded in the same manner as certificates of registration are recorded and the name of the person whose certificate of registration is so revoked shall be stricken from the list of registered professional engineers and he

shall be disqualified from practicing as a professional engineer in the State of Florida.

The Board may re-issue a certificate of registration to any person whose certificate has been revoked, but only after the expiration of one year from the date of such revocation, for reasons which the Board shall determine to be satisfactory.

SEC. 13. Every certified professional engineer so registered under this Act who desires to continue the practice of his profession shall annually pay to the Secretary of the Board a fee of Five Dollars ($5.00) on or before a date to be fixed by the Board, for which fee a renewal certificate of registration for the current year shall be issued.

SEC. 14. It shall be unlawful for any professional engineer to participate in or derive any profit from the subject matter of his professional employment, either in the matter of construction work or materials.

SEC. 15. Every unrevoked certificate and endorsement of registry made as provided in this Act shall be presumptive evidence in all courts and places that the person named therein is legally registered.

SEC. 16. The provisions of this Act shall apply to every corporation, domestic or foreign, engaged in the business of professional engineering within the State of Florida, except that certificates of registration issued hereunder shall be held by one or more of its officers or employees instead of by such corporation.

SEC. 17. The Board shall, during the month of April in each year, certify and publish a complete list of registered professional engineers with their business addresses in a newspaper published in the State of Florida.

SEC. 18. Any person who, not being then legally authorized to practice professional engineering within this State according to the provisions of this Act and so registered according to law, shall practice, or attempt or advertise to practice, or hold himself out as authorized to practice professional engineering, or shall use in connection with his name, or otherwise assume, use or advertise any title or designation tending to convey the impression that he is a professional engineer, and any person who shall buy, sell or fraudulently obtain any certificate of registration or who shall aid or abet such buying, selling or fraudulently obtaining or who shall practice, or attempt or advertise to practice or hold himself out as authorized to practice professional engineering under cover of any certificate obtained or issued fraudulently or unlawfully or under fraudulent representations or wilful misstatement of fact in a material regard and any person who shall practice, or attempt or advertise to practice, or hold himself out as authorized to practice professional engineering under a false or assumed name or who shall falsely impersonate any professional engineer or former professional engineer of a like or different name or who shall violate any of the provisions of this Act, shall be guilty of a misdemeanor, and upon conviction thereof shall be punished according to law, and in addition his certificate of registration shall be automatically revoked.

SEC. 19. This Act shall not apply to any professional engineer working for the United States Government; nor to any professional engineer employed as an assistant to a professional engineer registered under this Act; nor to any professional engineer coming from without this State and employed therein until a reasonable time, as prescribed by the rules of the Board, shall have elapsed to permit the registration of such person under this Act, provided that before practicing within this State he shall have applied for the issuance to him of a certificate of registration and shall have paid the fee prescribed in this Act for admission to examination.

SEC. 20. This Act shall not apply to any architect registered by the State of Florida under the provisions of the Act creating the State Board of Architecture nor to any of the provisions of said Act.

SEC. 21. All laws or parts of laws in conflict with the provisions of this Act be and the same are hereby repealed.

SEC. 22. This Act shall take effect immediately upon its passage and approval by the Governor.

Report of a Joint Committee on Organization of an American Engineers Standards Committee to the Governing Boards of the American Society of Civil Engineers, American Institute of Mining Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, and the American Society for Testing Materials.*

PREAMBLE.

At the present time many bodies are engaged in the formulation of standards. There is no uniformity in the rules for such procedure in the different organizations; in some cases the committees engaged in the work are not fully representative, and in a considerable proportion of cases they do not consult all the allied interests. The present custom results in a considerable duplication of work, and there are in some fields several "standards" proposed for the same thing that differ from each other only slightly and that often in unimportant details. It is very much more difficult to obtain agreement between the proposers of overlapping standards after they have been published than it would be to get the proposers to agree before they had committed themselves publicly.

The American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the American Society for Testing Materials, having appointed this committee to consider the advisability of co-operating in Engineering Standardization, we recommend that these societies form a permanent organization by

* This report has not yet been presented to the Board of Direction, but is printed here for the information of the membership. The members of the American Society of Civil Engineers on this Committee were: W. H. Burr, J. H. Gregory, and H. N. Latey.

appointing a committee, as proposed in the following constitution and rules of procedure, to carry on this important work.

CONSTITUTION.

1.—The name of this committee shall be the American Engineering Standards Committee, hereinafter referred to as the Main Committee.

2.—The object of this committee is to unify and simplify the methods of arriving at engineering standards, to insure co-operation between the different societies, and to prevent duplication of work.

3.—This committee shall be composed of three representatives from each of the societies mentioned in the preamble and from such other societies as may be added later, the appointments to be made by the governing bodies of the respective societies.

4.—At its first meeting the committee shall divide itself into three groups, to serve one, two, and three years, one representative of each society to be in each group. Each year after the first, each society shall appoint one representative to serve for three years. Representatives may be reappointed. A vacancy shall be filled by the society to which the retiring representative belonged.

5.—*Officers.*—The committee shall elect annually a chairman and vice-chairman from its own membership. Officers so elected shall serve for one year, or until their successors are elected. These officers shall not serve for more than three consecutive terms. Vacancies may be filled by election at any regular or special meeting, providing notice has been given in the call for the meeting.

6.—The committee shall elect from its own members an Executive Committee of not less than five, and may delegate to it any of its powers, except that of approving "Recommended Practices" and "American Standards." (See Paragraph 13.)

7.—*The Executive Committee* shall engage a secretary who shall not be a member of the committee. This engagement shall be made annually within three months of the annual election.

8.—*Meetings.*—The committee shall hold at least four regular meetings each year on specified dates. It may hold additional meetings at any time at the call of the chairman on not less than ten days' notice.

9.—*Quorum.*—A quorum of the Main Committee for the transaction of business shall consist of at least two-thirds of the membership of the committee. A quorum of the Executive Committee shall be not less than a majority.

10.—*Duties.*—The chief duties of the Main Committee shall be:

a.—To receive and pass upon recommendations for standards submitted by Sectional Committees, but not to deal with the details of any particular standard;

b.—To formulate rules under which the Sectional Committees shall be constituted, organized, and conduct their work;

c.—To maintain a central office in the United Engineering Societies' Building in New York with a paid full-time secretary, which office shall also serve as a bureau of information.

11.—A Sectional Committee is a committee whose personnel or composition has been approved by the Main Committee as being sufficiently comprehensive and authoritative to prepare a particular standard, or group of standards, for submission to the Main Committee. It may be: the standing committee on Standards of an individual "co-operating society"; a special committee appointed by a "co-operating society" for the consideration of a special standard, or group of standards, within the obvious field of that society; a joint committee appointed by two or more societies; or as in such a case as that of the American Society for Testing Materials, the society itself.

12.—The term "Co-operating Society" as here used refers, not only to any one of the societies represented on the Main Committee, but also to any other society, a Government Technical Body, such as the Bureau of Standards, or an Army or Navy Construction Board, a Public Service Commission, or any other significant body vitally concerned with engineering standards. It is understood, however, that, as far as relates to the standards proposed, all co-operating societies shall abide by the rules laid down by the Main Committee.

13.—Any proposed standard submitted to, and approved by, the Main Committee shall be known as "Recommended Practice", or when, in the opinion of this committee it has proved its suitability, it shall be recommended as an "American Standard."

14.—The approval as "Recommended Practice" of any standard submitted to the Main Committee shall require the affirmative vote of three-fourths of the committee; the advance of status from "Recommended Practice" to "American Standard" shall require an affirmative vote of 90% of the Main Committee. Such votes may be by letter-ballot. Letter-ballots may be ordered at any regular or special meeting of the Main Committee.

15.—*Expenses.*—As soon as possible after its organization the Main Committee shall make an estimate of its expenses for the first year and submit it to the governing bodies of the societies represented on the Main Committee for their approval; such approval includes the pledge of each society for such share as may be agreed upon. After the first year the Main Committee shall present an annual budget to the governing bodies of the societies represented, not later than December 1st, each year.

Funds of the committee shall be in the custody of the secretary, who shall be placed under suitable bond, and shall be disbursed by him on vouchers signed by the chairman or vice-chairman.

16.—*Amendments* must be proposed in writing at least thirty days before the meeting of the Main Committee at which they are to be voted on. If passed by a three-fourths majority of those present, they shall be referred to the Governing Boards of all the societies represented in the Main Committee, and shall become operative only when all these Boards have given their approval.

Rules of Procedure.

1.—Each co-operating society shall notify the Main Committee of the names and affiliations of the members of, and the field covered by, any existing or proposed committee dealing with a standard of any

kind. It shall also send to the Main Committee not less than twenty copies of each standard which it has in force.

This information shall be assembled, classified, and kept up to date by the Secretary of the Main Committee, and shall be accessible at any time to each of the co-operating societies.

2.—Any proposal for a particular standard or group of standards shall be referred to the Main Committee, which shall designate an appropriate sectional committee to carry on the work.

3.—*Composition of Committees:*

(*a*) Sectional Committees dealing with standards of a commercial character (specifications, shop practices, etc.), shall be made up of representatives of producers, consumers, and general interests, no one of these interests to form a majority. A producer is a person, or the representative of a firm or corporation, directly concerned in the production of the commodity involved. A consumer is a person, or the representative of a firm or corporation, that uses the commodity involved, but is not directly concerned with its production. General interests include independent engineers, educators, and persons who are neither consumers nor producers, as defined above.

(*b*) Sectional Committees dealing with standards of a scientific or non-commercial character shall consist of persons specially qualified, without regard to their affiliations.

4.—*Sectional Committees* may consult specialists, or obtain any other evidence they may deem advisable.

5.—Every report of a Sectional Committee shall include a list of its members, with a statement of their business, professional, and technical society affiliations. The final vote shall be stated in detail, and attested by the signature, personal or authorized, of each member voting.

6.—Should a Sectional Committee be unable to agree on a report by a three-fourths majority, then the Main Committee may request the appointing society or societies to discharge it and appoint a new one; or the Main Committee may, with the approval of the societies interested, appoint a special committee to hear both sides and present recommendations.

7.—Co-operating societies shall not, in their publications, use the terms "Recommended Practice" or "American Standard" except in connection with standards that have received the approval of the Main Committee.

8.—"Recommended Practices" and "American Standards" approved by the Main Committee shall be copyrighted, and shall be printed in the official publications of the society or societies proposing them; they shall not be released prior to such publication.

9.—*Amendments* to the Rules of Procedure may be proposed at any meeting of the Main Committee, and, if so ordered, shall be sent in full to all members with the notice of a subsequent meeting at which they may be voted on. A three-fourths affirmative vote of those present will be required to pass an amendment.

C. A. ADAMS,
Chairman.

JUNE 19TH, 1917.

ANNOUNCEMENTS

The House of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

FUTURE MEETINGS

September 5th, 1917.—8.30 P. M.—A regular business meeting will be held, and a paper by Floyd A. Nagler, Jun. Am. Soc. C. E., entitled "Obstruction of Bridge Piers to the Flow of Water", will be presented for discussion.

This paper was printed in *Proceedings* for May, 1917.

September 19th, 1917.—8.30 P. M.—At this meeting a paper by Ray W. Berdeau, Jun. Am. Soc. C. E., entitled, "The Three 15-Cubic Yard Dipper Dredges, *Gamboa*, *Paraiso*, and *Cascadas*, as Supplied and Used on the Panama Canal", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

October 3d, 1917.—8.30 P. M.—This will be a regular business meeting. A paper by William Barclay Parsons, M. Am. Soc. C. E., entitled "The Cape Cod Canal", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

SEARCHES IN THE LIBRARY

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

It sometimes happens that references are found which are not readily accessible to the person for whom the search is made. In that case the material may be reproduced by photography, and this can be done for members at the cost of the work to the Society, which is

small. This method is particularly useful when there are drawings or figures in the text, which would be very expensive to reproduce by hand.

A list of 989 bibliographies made in the Library, giving the cost of each, was published in Vol. LXXX of *Transactions*.

Since October 1st, 1916, the Library of the American Society of Civil Engineers has ceased to exist, as such, having been merged with the Libraries of the Mining, Mechanical, and Electrical Engineers, and become a part of the Library of the United Engineering Society. There were 67 000 accessions, which were not duplicates, turned over to that Library.

Hereafter, therefore, requests for searches should be addressed to the Librarian, United Engineering Society, 29 West 39th Street, New York City.

PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper in *Proceedings*.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion, will be published as heretofore in *Proceedings*, and set down for presentation to a future meeting of the Society, and on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which, from their mathematical or technical nature, in the opinion of the Committee, are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 429 of the August, 1913, *Proceedings*.

LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Association, Organized 1905.

J. D. Galloway, President; E. T. Thurston, Secretary-Treasurer, 57 Post Street, San Francisco, Cal.

The San Francisco Association of Members of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet, and weekly informal luncheons. The former are held at 6 P. M., at the Palace Hotel, on the third Tuesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.30 P. M., every Wednesday, and the place of meeting may be ascertained by communicating with the Secretary.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in San Francisco, and any such member will be gladly welcomed as a guest.

(Abstract of Minutes of Meetings)

April 17th, 1917.—The meeting was called to order at the Palace Hotel; President Galloway in the chair; E. T. Thurston, Secretary; and present, also, 87 members and guests.

President Galloway, for the Committee on Military Affairs, reported the successful progress of lecture courses by Army officers, and also in regard to enlistments in the Officers' Reserve Corps.

The Committee on Past-President Haehl's Recommendations for the good of the Association, through Mr. W. L. Huber, and the Committee on the Frickstad case, through Mr. W. J. Allan, reported matters at a standstill.

The Committee on Civil Service, through Mr. J. Newman, reported that the Committee was unable at this time to make a complete report, but Mr. Newman read a letter addressed to the Mayor and the Board of Supervisors of San Francisco, indicating the official attitude of the Association relative to the salaries of civil service employes of that city.

The Committee on Discussion of Society Proceedings, H. D. Dewell, Chairman, reported that the suggestion that special meetings in alternate months be held for that purpose, had been considered, and asked for an expression of opinion on the subject on the part of the meeting. The Committee was continued, and ordered to present a definite report at the next meeting.

The Committee appointed to oppose and prevent the passage of the proposed Architects' License Law before the State Legislature, through Mr. C. H. Snyder, presented a brief report of the Committee's trip to Sacramento and its temporary success in having the measure tabled in the Assembly Committee. Relative to this matter, the Secretary reported that the bill had been again taken up by the Assembly Committee and, after amendment, had been passed out of Committee with favorable recommendations. The Committee of the Association was continued and instructed to continue its efforts against the bill until the adjournment of the Legislature.

The Committee on Revision of Building Laws of San Francisco reported progress, through Mr. H. J. Brunnier.

The Secretary announced that a communication from the St. Louis Association proposing certain amendments to the Constitution of the Society had been discussed by the Board of Directors, which decided that action on this matter be delayed pending information as to the

report of the Committee of the Society on Amendments to the Constitution. He also announced the endorsement by the St. Louis Association of the suggestions that amendments to the Constitution be submitted separately for informal discussion and expression of opinion by the various Associations before the complete document is submitted for vote to the membership of the Society.

President Galloway reported that he had received a communication from the Professional Classes War Relief Council, Inc., requesting contributions for the fund for the relief of distressed families of engineers in Great Britain who had been forced out of employment by the war. He stated that the Board of Directors had suggested a donation of $100, but after discussion, on motion, duly seconded, the contribution of the Association was raised to $500.

Communications from the Navy Yard, Mare Island, relative to applications for examinations for commissions in the Civil Engineers Corps of the Navy, and from T. C. Desmond and Company, New York City, relative to enlistment of engineers in the proposed volunteer regiment to be organized under the command of Colonel Roosevelt for immediate service in France, were referred to the Committee on Military Affairs.

Mr. W. A. Cattell, Secretary of the International Engineering Congress, read an interesting statement relative to the origin, development, and finances of that Congress.

An interesting paper, consisting of personal reminiscences of work on the early railroads in the West, entitled "Fifty Years of Railroad Development in the Western United States", by Mr. William Hood, was presented by the author.

Adjourned.

June 19th, 1917.—The meeting was called to order at the Palace Hotel; President Galloway in the chair; E. T. Thurston, Secretary; and present, also, 48 members and guests.

Messrs. Beebee, Holly, and McWethy were appointed as the Entertainment Committee for the August meeting.

President Galloway, of the Military Affairs Committee, reported that the military lectures had been concluded because the Army officers were otherwise occupied. Reports in behalf of the Committees on the Frickstad matter, the Civil Service Laws, the discussion of Society Proceedings, and the Revision of Building Laws indicated little activity. The President reported the death of the Architects' License Bill. The organization of the Engineering Council of the National Engineering Societies was announced, and also the appointment of Mr. Galloway as one of the five members from the American Society of Civil Engineers.

The Secretary read a communication from Mr. L. B. Stillwell in appreciation of the contribution of the Association to the Professional Classes War Relief Council of Great Britain; reported having made the final payment on the new Western Pacific Railroad Corporation bond subscription, amounting to $580.25, finally establishing the ownership by the Association of one $800 bond, preferred stock to the value of $1 000, and common stock to the value of $1 900; and

announced the investment, on the authority of the Board of Directors, in $200 worth of Liberty Loan bonds.

As there remained on hand a surplus of $100 more than the anticipated expenditures for the year, this sum, on motion, duly seconded, was donated to the American Red Cross War Fund.

George W. Howson, Assoc. M. Am. Soc. C. E., delivered an address on "The Development of the Stanislaus River, with Special Reference to Strawberry Dam."

The subject of the address was discussed by Messrs. Galloway, Grunsky, O'Shaughnessy, and Vensano.

The report of the Committee on the Relations of Local Associations of the American Society of Civil Engineers to that Society, to other Engineering Organizations, and Engineers, and to the Public, as published in the *Proceedings* for May, 1917, was discussed, and disclosed a general approval of the report. On motion, duly seconded, it was unanimously resolved to endorse particularly the suggestion that local organizations be known as "Sections of the American Society of Civil Engineers" instead of "Associations of Members of the American Society of Civil Engineers."

Adjourned.

Colorado Association, Organized 1908.

Thomas W. Jaycox, President; L. R. Hinman, Secretary-Treasurer, 1400 West Colfax Avenue, Denver, Colo.

The meetings of the Colorado Association of Members of the American Society of Civil Engineers (Denver, Colo.) are held on the second Saturday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Weekly luncheons are held on Wednesdays at 12.30 P. M., at Daniel's and Fisher's.

Visiting members are urged to attend the meetings and luncheons.

(Abstract of Minutes of Meeting)

April 14th, 1917.—The meeting was called to order at the Denver Athletic Club; Vice-President Follansbee in the chair; L. R. Hinman, Secretary; and present, also, 14 members.

The minutes of the meeting of March 10th, 1917, were read and approved.

The Secretary read a letter from Thomas C. Desmond, Assoc. M. Am. Soc. C. E., requesting distribution of information relative to the Engineer Regiment in the proposed Roosevelt Division.

For the Committee on Co-operation, the Secretary outlined the work done thus far in the attempt of the various engineering societies of Colorado to effect a satisfactory joint organization, the efforts to date having been instigated by the Colorado Scientific Society.

For the Committee on Roads and Highways, Mr. A. E. Palen presented an abstract of the "Progress Report of the Special Com-

mittee on Materials for Road Construction and on Standards for Their Test and Use." In the discussion that followed, Messrs. Phelps and Comstock took part.

On motion, duly seconded, it was decided to hold a special meeting for the purpose of discussing the Standley Lake Dam, and also for the presentation of an abstract of the paper entitled "Multiple-Arch Dams on Rush Creek, California," by L. R. Jorgensen, M. Am. Soc. C. E., by the Committee on Dams.

Adjourned.

Atlanta Association, Organized 1912.

Paul H. Norcross, President; Thomas P. Branch, Secretary-Treasurer, Georgia School of Technology, Atlanta, Ga.

The Association holds its meetings at the University Club, Atlanta, Ga. Regular monthly luncheon meetings are held to which visiting members of the Society are always welcome.

Baltimore Association, Organized 1914.

Mason D. Pratt, President; Charles J. Tilden, Secretary-Treasurer, The Johns Hopkins University, Baltimore, Md.

Cleveland Association, Organized 1914.

W. J. Watson, President; George H. Tinker, Secretary-Treasurer, 516 Columbia Building, Cleveland, Ohio.

Detroit Association, Organized 1916.

T. A. Leisen, President; Clarence W. Hubbell, Secretary; 2334 Dime Bank Building, Detroit, Mich.

The regular meetings of the Association are held on the second Friday of December, April, and October, the last being the Annual Meeting.

District of Columbia Association, Organized 1916.

A. P. Davis, President; John C. Hoyt, Secretary-Treasurer, U. S. Geological Survey, Washington, D. C.

Duluth Association, Organized 1917.

F. E. House, President; Walter G. Zimmermann, Secretary, Wolvin Building, Duluth, Minn.

The regular meetings of the Association are held monthly. The time and place of meeting are not fixed, but this information will be furnished on application to the Secretary. The Annual Meeting is held on the third Monday of May.

Illinois Association, Organized 1916.

C. F. Loweth, President, Chicago, Ill.

The regular meetings of the Association are held on the second Monday of March, June, September, and December, the last being the Annual Meeting. The hour and place of meeting are not fixed, but this information will be furnished on application to the President.

Louisiana Association, Organized 1914.

W. B. Gregory, President; Charles W. Okey, Secretary, Tulane University, New Orleans, La.

The regular meetings of the Association are held at The Cabildo, New Orleans, La., on the first Monday of January, April, July, and October.

Nebraska Association, Organized 1917.

Frank T. Darrow, President; Homer V. Knouse, Secretary-Treasurer, 115 City Hall, Omaha, Nebr.

Regular meetings of the Association are held on the first Saturday of each month, except July and August, and at such places as may be appointed from time to time by the Executive Committee. The Annual Meeting is held in Lincoln, Nebr., on the second Friday in January.

It is probable that frequent luncheons will be held in Omaha, in addition to the monthly meetings, at which visiting members will be welcomed. The place of meeting may be ascertained by communicating with the Secretary.

(Abstract of Minutes of Meeting)

June 2d, 1917.—The meeting was called to order at 8.00 P. M., at the Paxton Hotel, Omaha, Nebr.; Vice-President Dobson in the chair; Homer V. Knouse, Secretary; and present, also, 7 members and 3 guests.

The minutes of the two preceding meetings were read and approved, as corrected.

A communication from E. T. Thurston, Secretary of the San Francisco Association, pertaining to the equitable apportionment of Vice-Presidents of the Society among the various Districts, was read by the Secretary.

The Secretary presented a letter from Mr. E. G. Haines relative to the work of the Society's Special Committee on the Bearing Value of Soils.

A communication from Chas. Warren Hunt, Secretary of the Society, requesting action by the Association on the relations of Local Associations with the Society and with other Local Associations and clubs, was read by the Secretary, and the Chairman called the attention of the Association to the advisability of immediate action.

As a basis for discussion of the subject, the Secretary read the Report of the Committee of the Board of Direction on the Relation of Local Associations of the American Society of Civil Engineers to that Society, to other Engineering Organizations and Engineers, and to the Public, as published in the *Proceedings* for May, 1917.*

After discussion by paragraphs, on motion, duly seconded, the report was endorsed, with the following changes: Under the subheading, "Local Societies", it was recommended that this paragraph, read as follows: "Local Sections should affiliate with existing Engineering Societies", and that the remainder of the paragraph be omitted.

* Pages 327–330.

On motion, duly seconded, it was decided as desirable that District No. 10 should have representation in the office of Vice-President of the Society, and that it be suggested to the Nominating Committee to nominate Mr. H. S. Crocker as a candidate for that office.

On motion, duly seconded, the Chairman was authorized to appoint a Committee of the Association to co-operate with the Society's Special Committee on the Bearing Value of Soils, and collect data on this subject. Messrs. McClintock, Mickey, and Arend were subsequently appointed as such a Committee.

The following resolution, to be presented to the Hon. Keith Neville, Governor of Nebraska, was adopted:

"*Whereas,* the five American Engineering Societies proffered the United States Government during 1916 their services in making an inventory of the industrial plants and resources of the country, which has been accomplished in a creditable manner, and

"*Whereas,* the country is now in a state of war and the need of further industrial inventory or of other assistance is probable; therefore be it

"*Resolved,* that the Nebraska Association of Members of the American Society of Civil Engineers at the regular meeting at Omaha, Nebraska, on June the second, nineteen hundred and seventeen, tender their services, collectively or individually, to the State for such duties as your Excellency may see fit."

Adjourned.

Northwestern Association, Organized 1914.

George L. Wilson, President; Ralph D. Thomas, Secretary, 508 South First Street, Minneapolis, Minn.

Philadelphia Association, Organized 1913.

Samuel T. Wagner, President; C. W. Thorn, Secretary, 1313 South Broad Street, Philadelphia, Pa.

The regular meetings of the Association are held at the Engineers' Club of Philadelphia, 1317 Spruce Street, on the first Monday in January, April, and October, the last being the Annual Meeting.

Portland, Ore., Association, Organized 1913.

J. P. Newell, President; J. A. Currey, Secretary, 194 North 13th Street, Portland, Ore.

St. Louis Association, Organized 1914.

J. A. Ockerson, President; Gurdon G. Black, Secretary-Treasurer, 34 East Grand Avenue, St. Louis, Mo.

The meetings of the Association are held at the Engineers' Club Auditorium. The Annual Meeting is held on the fourth Monday in November. The time of other meetings is not fixed, but this information will be furnished on application to the Secretary.

San Diego Association, Organized 1915.

W. J. Gough, President; J. R. Comly, Secretary-Treasurer, 4105 Falcon Street, San Diego, Cal.

Seattle Association, Organized 1913.

Joseph Jacobs, President; Carl H. Reeves, Secretary-Treasurer, 444 Henry Building, Seattle, Wash.

The regular meetings of the Association are held at 12.15 P. M., on the last Monday of each month, at The Frye Hotel.

(Abstract of Minutes of Meetings)

April 30th, 1917.—The meeting was called to order at 12.15 P. M., at The Frye Hotel; President Jacobs in the chair; Carl H. Reeves, Secretary; and present, also, 18 members and guests.

The minutes of the meeting of March 29th, 1917, were read and approved.

The resignation of Mr. L. R. Hjorth as a member of the Association was presented and accepted.

A communication from the Secretary of the National Conference on City Planning, *in re* the Annual Conference to be held in Kansas City, Mo., on May 7th-8th, 1917, was read, and the President stated that he would be glad to give proper credentials as Delegate to any member of the Association who could attend the Conference.

Mr. John L. Hall, President of The Associated Engineering Societies of Seattle and a member of the Executive Committee of the Central Council for Patriotic Service, presented an outline of the proposed work of the Council.

Mr. C. N. Kast, Field Engineer with the Interstate Commerce Commission, on railroad valuation, addressed the meeting briefly relative to the methods and objects of that work.

A letter from Mr. Thomas C. Desmond, of New York City, relative to the Roosevelt Division for service in France, was read, and the application blanks furnished by Mr. Desmond were distributed to those present. No action was taken by the Association on the subject-matter of the letter.

Adjourned.

May 28th, 1917.—The meeting was called to order at The Frye Hotel; President Jacobs in the chair; Carl H. Reeves, Secretary; and present, also, 23 members and guests.

The minutes of the meeting of April 30th, 1917, were read and approved.

The resignation of Mr. Roy E. Smith was accepted.

A letter from Chas. Warren Hunt, Secretary of the Society, relating to the report of a committee, appointed by the Board of Direction, on the Relations of Local Associations of the American Society of Civil Engineers to that Society, to other Engineering Organizations, and Engineers, and to the Public, was read and referred to the Committee on Relations with the Parent Society.

Mr. A. H. Fuller presented a brief outline of the work and objects of the National Research Council, and stated that this work was to be done in connection with the Council for the National Defense.

On motion, duly seconded, it was ordered that all members of the Association who have become affiliated with any of the arms of the service of the Government in connection with the prosecution

of the war, and while in actual service, be excused from the payment of dues.

Maj. E. J. Dent, U. S. A., spoke on matters in relation to the work of the Engineer Corps of the Army.

W. C. Weeks, M. Am. Soc. C. E., of Union Bay, B. C., Canada, spoke on labor and other conditions in British Columbia.

Adjourned.

June 25th, 1917.—The meeting was called to order at The Frye Hotel; President Jacobs in the chair; Carl H. Reeves, Secretary; and present, also, 24 members and guests.

The minutes of the meeting of May 28th, 1917, were read and approved.

The resignation of Mr. W. D. Shannon was accepted.

The Committee on Relations with the Parent Society presented an oral report on the matter affecting Local Associations, as presented in the *Proceedings* for May, 1917. The final report of this Committee was called for the July meeting, prior to which time the Secretary-Treasurer was instructed to have a copy of the report, as well as the Committee's previous report on similar matters, in the hands of each member.

The President called attention to the proposed revised Constitution of the Society, as printed in the *Proceedings* for May, 1917, and appointed Mr. A. H. Dimock to review the matter at the July meeting, if time should permit, or at a future meeting.

Adjourned.

July 30th, 1917.—The meeting was called to order at The Frye Hotel; President Jacobs in the chair; O. P. M. Goss, acting as Secretary; and present, also, 15 members and guests.

The minutes of the meeting of June 25th, 1917, were read and approved.

Mr. A. H. Fuller discussed the report of the Committee on Relations with the Parent Society. After various phases of the report had been discussed by Messrs. Dimock, Jacobs, Rathbun, Hall, and Howes, it was decided, on motion, duly seconded, that the Committee should modify the report by giving reasons for the adoption of various paragraphs. On motion, duly seconded, it was decided to amend the first paragraph to express the idea that the business of the Annual Meeting should be placed in the hands of a duly elected delegate only.

Mr. A. H. Dimock reviewed the proposed new Constitution of the Society.

Adjourned.

Southern California Association, Organized 1914.

H. Hawgood, President; Wilkie Woodard, Secretary, 435 Consolidated Realty Building, Los Angeles, Cal.

The Southern California Association of Members of the American Society of Civil Engineers (Los Angeles, Cal.) holds regular bi-monthly meetings, with banquet, at Hotel Clark, on the second Wednesday of

February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 P. M. every Wednesday, and the place of meeting may be ascertained from the Secretary.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in Los Angeles, and any such member will be gladly welcomed as a guest at any of the meetings or luncheons.

Spokane Association, Organized 1914.

J. C. Ralston, President; B. J. Garnett, Secretary, City Hall, Spokane, Wash.

The regular meetings of the Association are held on the second Friday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary.

Visiting members are invited to attend the meetings and luncheons.

(Abstract of Minutes of Meeting)

June 8th, 1917.—The meeting was called to order at the University Club; President Ralston in the chair; B. J. Garnett, Secretary.

The report of the Committee on the Post Street Bridge Failure was presented and adopted.

The question of the relations between Local Associations and the American Society of Civil Engineers was discussed.

Adjourned.

Texas Association, Organized 1913.

John B. Hawley, President; J. F. Witt, Secretary, Dallas, Tex.

Utah Association, Organized 1916.

George L. Swendsen, President; H. S. Kleinschmidt, Secretary-Treasurer, 306 Dooly Building, Salt Lake City, Utah.

The Annual Meeting of the Association is held on the first Wednesday in April. The time of other meetings is not fixed, but this information will be furnished on application to the Secretary.

(Abstract of Minutes of Meeting)

April 4th, 1917.—The Annual Meeting was called to order at the Newhouse Hotel, Salt Lake City, Utah; Vice-President A. F. Doremus in the chair; H. S. Kleinschmidt, Secretary; and present, also, 75 members and guests.

Ballots for officers for 1917 were canvassed, and resulted in the election of George L. Swendson, President, and R. C. Gemmell, Second Vice-President. A complete list of the officers of the Association for 1917 is as follows: George L. Swendsen, President; A. F. Doremus, First Vice-President; R. C. Gemmell, Second Vice-President; H. S. Kleinschmidt, Secretary-Treasurer.

Various matters of interest were discussed, and in the evening a joint meeting was held with the Utah Society of Engineers. After an

informal dinner, a stereopticon lecture was given by J. B. Lippincott, M. Am. Soc. C. E., on the "Los Angeles Aqueduct", and C. F. Brown, Assoc. M. Am. Soc. C. E., addressed the meeting on "Some Unusual Problems in Drainage."

Adjourned.

MINUTES OF MEETINGS OF SPECIAL COMMITTEES TO REPORT UPON ENGINEERING SUBJECTS

Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations, etc.

January 21st, 1917.—The meeting was called to order at the office of Allen Hazen, M. Am. Soc. C. E., New York City. Present Robert G. Cummings (Chairman), Edwin Duryea, E. G. Haines, Allen Hazen, and Walter J. Douglas (Secretary).

The past work of the Committee was discussed, and general plans for the future were made.

Mr. Hazen suggested that, after the Classification of Soils had been determined, and during the completion of such Classification, the Committee consider its work on the basis of character of soil troubles. After discussing the subject it was agreed that failures would be considered along the following lines, which would be used as a general guide:

(1).—Compression of the soils, divided generally as follows:
- (*a*) Breaking edges of the grain,
- (*b*) Squeezing out of water,
- (*c*) Result of organic inclusions.

(2).—Second general classification of failure:
Slipping. Quicksand, lubricants, etc.

(3).—Third general classification of failure:
Chemical changes.

It was also agreed that Mr. Hazen submit a proposed classification along these lines at an early date.

The work of the Committee for the coming year is to include a development of the subject along the lines of failure, as indicated in the foregoing classification, as well as definitions of soils, methods of analyses, and reports from the Sub-Committee on Earth Pressures, including apparatus for testing the bearing capacity of soils, a report of the Sub-Committee on Piles, and a report on existing data on the bearing capacity of earths.

The Committee also considered whether the word "earth" should be substituted for the word "soils", that is, "the bearing capacity of earth" instead of "the bearing capacity of soils."

April 19th, 1917.—The meeting was called to order at the House of the Society at 10.45 A. M. Present, Robert G. Cummings (Chairman), Edwin Duryea, and E. G. Haines (Secretary *pro tem.*).

The minutes of the meeting of January 21st, 1917, were read, and after some discussion of the last paragraph, were approved as

amended. It was agreed to retain the word "soils" as defined in the Committee's Report presented to the Annual Meeting of January 19th, 1916.

Mr. Haines reported that since November, 1916, Sub-Committee "E" had sent out 1 200 letters to engineers, requesting records of tests for lateral pressures, with the following results:

Letters sent out		1 200
No replies	1 004	
Replies with no records	131	
Replies suggesting possible sources of information	52	
Replies with information furnished	13	
Totals	1 200	1 200

After discussion, it was decided not to continue the investigation any further, at least at present, except to follow up the replies suggesting possible sources of information.

The Committee, it was reported, had on hand considerable information received at various times from various sources, much of which is of great value. It was decided that abstracts of such information should be prepared by the Secretary to be printed as an Appendix to the Progress Report of 1917.

Mr. Haines presented the results of some experiments with the soil testing apparatus furnished by Mr. Cummings, and stated that, judging from the results of these tests, and after certain changes had been made which would permit of a greater range of pressures and bearing areas, and also provide for applying pressures over a longer interval of time, the instrument was capable of being developed into a practical form which could be used to advantage.

Mr. Cummings presented a letter dated April 6th, 1917, from John H. Griffith, M. Am. Soc. C. E., Chairman of the Sub-Committee on Soils of the Bureau of Standards. This letter contained much that was of interest relative to the work of the Committee, and the Chairman was instructed to send copies of it to each member of the Board of Direction of the Society.

Mr. Cummings reported that Professor J. Hammond Smith, of the University of Pittsburgh, would design, at no cost to the Society, a full-sized testing apparatus, similar in principle to his smaller apparatus, for determining pressures on granular materials.

The matter of practical field tests for determining the bearing value of soils was discussed, and it was decided that such tests should be made on the basis of 1 sq. ft. of area, the testing area to be in the form of a circle, and that the tested areas should be below the surrounding surface, or otherwise restrained. Mr. Haines agreed to prepare a tentative sketch of a practical field testing apparatus to comply with the requirements.

Mr. Hazen's paper on the reasons for soil failures was discussed in detail and certain changes were suggested. It was then agreed that copies of all written discussions by members of the Committee

should be sent direct to each member of the Committee, including the President of the Society.

The meeting was adjourned at 6 P. M. subject to the call of the Chair.

Special Committee on Materials for Road Construction

May 5th, 1917.—The meeting was called to order at 9.15 A. M.; at the House of the Society. Present, W. W. Crosby (Chairman), A. W. Dean, Charles J. Tilden, George W. Tillson, and A. H. Blanchard (Secretary).

The minutes of the meeting of February 22d, 1917, were read and approved.

Plans for the drafting of a Final Report to be presented at the Annual Meeting of the Society in January, 1918, were adopted, and fourteen sub-committees were appointed to prepare preliminary drafts of the several sub-divisions of the report.

On motion, the Committee adjourned to meet at 9 A. M., on Saturday, May 19th, 1917, at the House of the Society.

May 19th, 1917.—The meeting was called to order at the Society House at 9.30 A. M. Present, W. W. Crosby (Chairman), H. K. Bishop, A. W. Dean, Nelson P. Lewis, and A. H. Blanchard (Secretary).

The minutes of the meeting of May 5th, 1917, were approved.

On motion, duly seconded, it was decided that the Reports of Sub-Committees on Introduction, General Principles Concerning Materials and Their Use to be Observed in Framing Specifications for Pavements and Road Crusts, Asphalt Block Pavements, Bituminous Concrete Pavements, and Bituminous Macadam Pavements, be accepted tentatively, be referred back to the several sub-committees, be revised, including the addition of amendments adopted, and that copies of the revised reports be forwarded by each Sub-Committee to each member of the Committee not later than one week prior to the date to be hereafter set for the consideration of the final draft of the 1918 Report.

On motion, duly seconded, the Committee adjourned to meet at 9 A. M., on Monday, June 18th, 1917, at the House of the Society.

June 18th, 1917.—The meeting was called to order at the House of the Society at 9.45 A. M. Present, W. W. Crosby (Chairman), A. W. Dean, Nelson P. Lewis, and A. H. Blanchard (Secretary).

The minutes of the meeting of May 19th, 1917, were approved.

On motion, duly seconded, it was ordered that the following reports of Sub-Committees be tentatively accepted, be referred back to the several sub-committees, be revised, including the addition of amendments adopted, and that copies of the revised reports be forwarded by each Sub-Committee to each member of the Committee not later than one week prior to the date to be hereafter set for the consideration of the final draft of the 1918 Report:

Report on "Brick Pavements"; report on section of "General Conclusions" covering "Bituminous and Non-Bituminous Materials"; report on "Broken Stone Roads"; report on "Earth and Sand-Clay Roads"; and report on "'Sheet-Asphalt Pavements".

On motion, duly seconded, it was ordered that each report on a specific type of road or pavement begin with an introductory paragraph containing references to those sections under "General Conclusions" which pertain to details of construction of the given type of road or pavement to which the report refers.

On motion, duly seconded, it was ordered that the Sub-Committee on Broken Stone Roads with Bituminous Surfaces be discontinued, and that Mr. A. W. Dean be appointed a sub-committee on Bituminous Surface Treatments, and be requested to submit the report at the next meeting of the Committee.

On motion, the Committee adjourned to meet at 9 A. M. on Monday, July 9th, 1917, at the House of the Society.

July 9th, 1917.—The meeting was called to order at the House of the Society, at 9.45 A. M. Present, Nelson P. Lewis (Chairman *pro tem.*), Charles J. Tilden, George W. Tillson, and Arthur H. Blanchard (Secretary).

The minutes of the meeting of June 18th, 1917, were approved.

On motion, duly seconded, it was decided that the Reports of the Sub-Committees on Cement-Concrete Pavements, Gravel Roads, Stone Block Pavements, Wood Block Pavements, Analyses and Tests of Bituminous Materials, and Analyses and Tests of Non-Bituminous Materials, be tentatively accepted, referred back to the several sub-committees, be revised, including the addition of amendments adopted, and that copies of the revised reports be forwarded by each Sub-Committee to each member of the Committee not later than one week prior to the date to be hereafter set for the consideration of the final draft of each Sub-Committee report.

On motion, duly seconded, it was agreed that the Sub-Committee on Forms be requested to present, in its Final Report, one form, to be an historical record of construction applicable to all types of roads and pavements and similar in character to that included as Appendix A in the Progress Report of the Committee for 1916.

On motion, duly seconded, it was decided that the order of business for the next meeting of the Committee be as follows: Preliminary report of the Sub-Committee on Bituminous Surface Treatments; Preliminary reports of the Sub-Committees on Definitions; Final report of the Sub-Committee on Forms; Final report of the Sub-Committee on Introduction, General Conclusions and General Principles.

On motion, duly seconded, the Committee adjourned to meet at 9.30 A. M., on Monday, August 27th, 1917, at the House of the Society.

Special Committee on Steel Columns and Struts

June 18th, 1917.—The meeting was called to order at the House of the Society at 10.15 A. M. Present, Lewis D. Rights (Chairman), Joseph R. Worcester, George F. Swain, and Clarence W. Hudson (Secretary). Professor Nelson, of the Bureau of Standards, was also present.

Professor Nelson reported that 28 specimen tests of the material of the tested columns had been made since the meeting of January

17th. This number, with those made previous to that meeting, gives a total of 130 tests of such column material.

Professor Nelson also stated that the Bureau was very busy with Government work, and that little, if any, work could be expected on the Committee's supplementary tests.

The Committee requested Professor Nelson to look up the reports, of the Bureau of Standards in Pittsburgh, on the material used in columns, Types 1, 1*a*, 4, 4*a*, 5, 5*a*, and 5*b*, and see if it met the specifications.

On motion, duly seconded, the work of the Sub-Committee, consisting of the Chairman and Secretary, in preparing the drawing of the stress-strain curves, showing the determination of the useful limit point of the columns tested, was approved.

On motion, duly seconded, the Chairman and Secretary were instructed to draw up a final report and submit it to the members of the Committee for discussion and approval.

PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms, and at all meetings:

American Institute of Electrical Engineers, 25 West Thirty-ninth Street, New York City.

American Institute of Mining Engineers, 25 West Thirty-ninth Street, New York City.

American Society of Mechanical Engineers, 25 West Thirty-ninth Street, New York City.

Associação dos Engenheiros Civis Portuguezes, Lisbon, Portugal.

Australasian Institute of Mining Engineers, Melbourne, Victoria, Australia.

Boston Society of Civil Engineers, 715 Tremont Temple, Boston, Mass.

Brooklyn Engineers' Club, 117 Remsen Street, Brooklyn, N. Y.

Canadian Society of Civil Engineers, 176 Mansfield Street, Montreal, Que., Canada.

Civil Engineers' Society of St. Paul, St. Paul, Minn.

Cleveland Engineering Society, Chamber of Commerce Building, Cleveland, Ohio.

Cleveland Institute of Engineers, Middlesbrough, England.

Dansk Ingeniorforening, Amaliegade 38, Copenhagen, Denmark.

Detroit Engineering Society, 46 Grand River Avenue, West, Detroit, Mich.

Engineering Association of Nashville. Commercial Club Building, Nashville, Tenn.

Engineers and Architects Club of Louisville, 1412 Starks Building, Louisville, Ky.

Engineers' Club of Baltimore, 6 West Eager Street, Baltimore, Md.

Engineers' Club of Kansas City, E. B. Murray, Secretary, 920 Walnut Street, Kansas City, Mo.

Engineers' Club of Minneapolis, 17 South Sixth Street, Minneapolis, Minn.

Engineers' Club of Philadelphia, 1317 Spruce Street, Philadelphia, Pa.

Engineers' Club of St. Louis, 3817 Olive Street, St. Louis, Mo.

Engineers' Club of Toronto, 96 King Street, West, Toronto, Ont., Canada.

Engineers' Club of Trenton, Trent Theatre Building, 12 North Warren Street, Trenton, N. J.

Engineers' Society of Northeastern Pennsylvania, 415 Washington Avenue, Scranton, Pa.

Engineers' Society of Pennsylvania, 31 South Front Street, Harrisburg, Pa.

Engineers' Society of Western Pennsylvania, 568 Union Arcade Building, Pittsburgh, Pa.

Florida Engineering Society, J. R. Benton, Secretary, Gainesville, Fla.

Institute of Marine Engineers, The Minories, Tower Hill, London, E., England.

Institution of Civil Engineers, Great George Street, Westminster, S. W., London, England.

Institution of Engineers of the River Plate, Calle 25 de Mayo 195, Buenos Aires, Argentine Republic.

Institution of Naval Architects, 5 Adelphi Terrace, London, W. C., England.

Junior Institution of Engineers, 39 Victoria Street, Westminster, S. W., London, England.

Koninklijk Instituut van Ingenieurs, The Hague, The Netherlands.

Louisiana Engineering Society, State Museum Building, Chartres and St. Ann Streets, New Orleans, La.

Memphis Engineers' Club, Memphis, Tenn.

Midland Institute of Mining, Civil and Mechanical Engineers, Sheffield, England.

Montana Society of Engineers, Butte, Mont.

North of England Institute of Mining and Mechanical Engineers, Newcastle-upon-Tyne, England.

Oregon Society of Civil Engineers, Portland, Ore.

Pacific Northwest Society of Engineers, 803 Central Building, Seattle, Wash.

Rochester Engineering Society, Rochester, N. Y.

Sociedad Colombiana de Ingenieros, Bogota, Colombia.

Sociedad de Ingenieros del Peru, Lima, Peru.

Societe des Ingenieurs Civils de France, 19 rue Blanche, Paris, France.

Society of Engineers, 17 Victoria Street, Westminster, S. W., London, England.

Svenska Teknologforeningen, Brunkebergstorg 18, Stockholm, Sweden.

Tekniske Forening, Vestre Boulevard 18–1, Copenhagen, Denmark.

Vermont Society of Engineers, George A. Reed, Secretary. Montpelier, Vt.

Western Society of Engineers, 1737 Monadnock Block, Chicago, Ill.

ACCESSIONS TO THE UNITED ENGINEERING SOCIETY LIBRARY

(From April 3d to July 10th, 1917)

DONATIONS*

The statements made in these notices are taken directly from the book itself, and this Society is not responsible for them.

DOCUMENTS GOVERNING THE CONSTRUCTION OF A BRIDGE:

Including a Reprint of the Specifications, Proposal, Contract and Bond of the Columbia River Interstate Bridge, a Description of the Structure, and a Discussion of the Function of Specifications. By E. E. Howard. N. Y., John Wiley & Sons; Lond., Chapman & Hall, Ltd., 1916. 113 pp., 8 x 11 in., 1 pl., paper. $1.00.

These specifications have been printed in book form with the thought that they may be of value in suggesting satisfactory substance and arrangement for like documents, being the product, the author states, of a variety of experiences, of technical opinions and engineering judgments reached only after years of practice.

SPONS' ELECTRICAL POCKET-BOOK:

A Reference Book of General Electrical Information, Formulae and Tables for Practical Engineers. By Walter H. Molesworth. N. Y., Spon & Chamberlain; Lond., E. & F. N. Spon, Ltd., 1916. 488 pp., 4 x 7 in., 325 illus., cloth. $2.00.

This book has been written for practical engineers, and it has been the aim to treat all subjects concisely and to avoid intricate mathematics. Full metric conversion tables have been inserted.

ELECTRICAL MEASURSEMENTS IN PRACTICE.

By Malcolm Farmer. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 12 + 359 pp., 230 illus., 6 x 9 in. $4.00.

Intended to present the subject in a simple practical manner, from the point of view of engineers actively engaged in making measurements, tests and investigations in the electrical industry. All classes of measurements ordinarily made in the laboratory or by the testing engineer are included.

CENTRAL-STATION ELECTRIC SERVICE:

Its Commercial Development and Economic Significance as Set Forth in the Public Addresses (1897-1914) of Samuel Insull. Edited, with an Introduction, by William Eugene Kelly. Chic., privately printed, 1915. 39 + 495 pp., 9 x 6 in., 105 illus., 36 pl., cloth. (Gift of the author.)

A collection of forty speeches bearing on central station electric service, delivered by the author between 1897 and 1914. The editor states that these addresses are the work of one who has led the way to new conceptions of the economic functions of central station electric service, and that much information of historical value, some of it never before published, is scattered through the book.

THE POWER KINK BOOK:

Novel Ideas and Simple Devices for Meeting Emergencies in the Power Plant, Compiled from the Regular Issues of *Power*. N. Y., Power, 1917. 146 pp., 147 illus., 6 x 9 in., boards. $1.75.

A collection of methods devised by power plant engine runners and machinists for making repairs, overcoming difficulties, and preventing accidents. The methods are classified into appropriate groups and clearly illustrated by numerous drawings and sketches.

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* Unless otherwise specified, books in this list have been donated by the publishers.

ARTIFICIAL ELECTRIC LINES:

Their Theory, Mode of Construction and Uses. By A. E. Kennelly. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 348 pp., 117 illus., 6 x 9 in., cloth. $4.00. (Gift of the author.)

Intended as a text-book for engineering-laboratory students and as a reference book for students of electric transmission in general. Based on the author's "The Application of Hyperbolic Functions to Electrical Engineering Problems." Restricted almost entirely to the phenomena of the steady state.

STORAGE BATTERIES SIMPLIFIED:

Operating Principles—Care and Industrial Applications; a Complete, Non-technical but Authoritative Treatise Discussing the Development of the Modern Storage Battery, Outlining the Basic Operation of the Leading Types, also the Methods of Construction, Charging, Maintenance and Repair. All Practical Applications of Commercial Batteries are Shown and Described. By Victor W. Page. 208 pp., 89 illus., 5 x 8 in., cloth. $1.50.

Special instructions for care and repair of automobile batteries and a glossary of terms are included.

TELEGRAPHY:

A Detailed Exposition of the Telegraph System of the British Post Office. 3d ed. rev. and enl. N. Y., The Macmillan Co.; Lond., Whittaker & Co., 1916. 20 + 985 pp., 630 illus., 7½ x 5 in., cloth. $3.50.

Intended as a detailed exposition of the telegraph practice of the British Post Office and for students. Mathematics is avoided. This edition has been revised to include the latest practice and to correct errors.

A WONDERFUL FIFTY YEARS.

By Edwin T. Holmes. Privately published (copyright 1917). 133 pp., 55 illus., 6 x 9 in., cloth. (Gift of the author.)

Personal reminiscences of the development of electrical communication from 1866 to 1916, during which time the author has been connected with the telegraph, telephone and electrical protective signaling industries of the country. Contains many interesting illustrations, reproductions of documents, and letters of historic interest.

THE NAVAL ARCHITECTS' AND SHIPBUILDERS' POCKET-BOOK

Of Formulae, Rules, and Tables: And Marine Engineers' and Surveyors' Handy Book of Reference. By Clement Mackrow and Lloyd Woodland. 11th ed. thoroughly rev., with a Section on Aeronautics. N. Y., The Norman W. Henly Publishing Co., 1916. 12 + 742 pp., 6 x 4 in., 150 illus., flexible leather. $5.00.

The continual development of the science of naval architecture and the tendency towards standardization and regulation of parts of the structure and equipment of ships have created a need, the authors state, for a new edition of this work. Their object has been, as in former editions, to condense into a compact form all the data and formulas ordinarily required by the shipbuilder or naval architect. A new section on Speed and Horse-Power has been inserted, together with a brief description of modern methods of powering and determining forms suitable from a propulsive standpoint; the sections on Strength of Materials, Riveted Joints and Stresses in Ships have been considerably extended; information on British standard sections, screws, keys, etc., has been added as well as two new sections on aeronautical matters. The remaining subjects treated, which were also in previous editions, have been brought completely up to date.

PRACTICAL MARINE ENGINEERING;

For Marine Engineers and Students, with Aids for Applicants for Marine Engineers' Licenses. By Capt. C. W. Dyson. 4th ed. rev.

and enl. N. Y., *Marine Engineering*, 1917. 16 + 982 pp., 500 illus., 6 x 9 in., cloth. $6.00.

A simple and fairly complete treatise, intended for operative engineers, and hence paying especial attention to the construction, operation, management, and care of marine machinery. The use of higher mathematics is avoided.

MOTOR BOATS, HYDROPLANES, HYDROAEROPLANES;

Construction and Operation, with Practical Notes on Propeller Calculation and Design; An Illustrated Manual of Self Instruction for Owners and Operators of Marine Gasoline Engines and Amateur Boat-Builders. By Thomas H. Russell, with Revisions and Extensions by John B. Rathbun. Chic., Charles C. Thompson Co., 1917. 254 pp., 106 illus., 5 x 8 in., cloth. $1.00.

Practical, non-mathematical handbook. Directions for building motor-boats are given, together with information concerning the various available types of motors and detailed instruction for their installation and operation.

MECHANICAL MOVEMENTS, POWERS, AND DEVICES;

A Treatise Describing Mechanical Movements and Devices Used in Constructive and Operative Machinery and the Mechanical Arts, Being Practically a Mechanical Dictionary, Commencing with a Rudimentary Description of the Early Known Mechanical Powers and Detailing the Various Motions, Appliances and Inventions Used in the Mechanical Arts to the Present Time. Including a Chapter on Straight Line Movements. By Gardner D. Hiscox. N. Y., The Norman W. Henley Publishing Co., 1917. 409 pp., 1 800 illus., 6 x 9 in., cloth. $3.00.

This edition is enlarged by the addition of over one hundred and sixty new mechanical movements and devices, and contains a total of sixteen hundred and sixty-five examples.

MECHANICAL APPLIANCES, MECHANICAL MOVEMENTS AND NOVELTIES OF CONSTRUCTION.

By Gardner D. Hiscox. 4th ed. enl. N. Y., The Norman W. Henley Publishing Co., 1917. 396 pp., 1 000 illus., 6 x 9 in., cloth. $3.00.

A companion volume to the author's "Mechanical Movements, Powers and Devices," in which the special requirements of various arts and manufactures are considered, and more detailed explanations of the devices are given. Includes a chapter on perpetual motion, illustrating many types of perpetual motion machines.

STEAM POWER.

By C. F. Hirshfeld and T. C. Ulbricht. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1916. 8 + 420 pp., 8 x 5 in., 91 illus., cloth. $2.00.

An attempt to collect in a comparatively small book such parts of the field of steam power as should be familiar to engineers whose work does not require that they be conversant with the more complicated thermodynamic principles considered in advanced treatments. Mathematical treatment of the subject has been eliminated to the greatest possible extent. Intended for use as a text-book by students of civil engineering and in teaching power plant operators.

STEAM PIPING:

Its Economical Design and Correct Layout. By A. Langstaff Johnston, Jr. N. Y., The Engineering Magazine Co., 1916. 6 + 62 pp., 5 x 8 in., 3 illus., 4 diagrams, cloth. $2.00.

Consolidated and revised from a series of articles published in the *Engineering Magazine* in 1915. Analyzes the factors governing the flow of steam in pipes, and presents a group of curves for use in solving the problems of practical installation

and determining the most economical size of pipe to select for any given conditions. Contents: How to Find the Right Pipe Sizes; Special Conditions Affecting Low-Pressure Systems; and Savings Obtainable from Exhaust Steam.

STEAM TURBINES:

A Practical Work on the Development, Advantages and Disadvantages of the Steam Turbine; The Design, Selection, Operation, and Maintenance of Steam Turbine and Turbo-Generator Plants. By Walter S. Leland. Chic., American Technical Society, 1917. 137 pp., 116 illus., 6 x 8 in., cloth. $1.00.

Intended for those less interested in the finer points of steam turbine theory than in the results accomplished and the way in which they have been secured by the successful builders. Over one-half of the book is devoted to descriptions of various commercial turbines.

STEAM TURBINES:

A Treatise Covering U. S. Naval Practice. By G. J. Myers. Annapolis, The U. S. Naval Institute, 1917. 7 + 246 pp., 12 x 8 in., 179 illus., 23 diagrams, 9 pl., cloth. $4.50.

This book has been prepared to meet the needs of an elementary treatise on steam turbines for the use of midshipmen at the U. S. Naval Academy, and deals mainly with types found in the U. S. Naval Service.

HIGH SPEED INTERNAL COMBUSTION ENGINES.

By Arthur W. Judge. N. Y., The Macmillan Co.; Lond., Whittaker & Co., 1916. 9 + 350 pp., 217 illus., 6 x 9 in., cloth. $5.50.

The author has collected and classified the available information, and presents it as briefly as possible. The work discusses the theory of high speed internal combustion engines, and the experimental results which have been obtained. Contents: The Thermodynamics of the Internal Combustion Engine; The Conditions Occurring in Actual Engines; Pressures and Temperatures in Internal Combustion Engines; Indicators and Indicator Diagrams; The Mechanics of the High-Speed Internal Combustion Engine; Engine Balance.

GAS CHEMISTS' HANDBOOK.

Compiled by Technical Committee, Sub-Committee on Chemical Tests, 1916, of the American Gas Institute. C. C. Tutweiler, Chairman; A. F. Kunberger, Editor. N. Y., American Gas Institute. 354 pp., 9 x 6 in., 70 illus., cloth. $3.50.

The present handbook, a revision of the one compiled in 1914, presents methods for sampling and testing the materials used in gas manufacture. Contents: Raw Materials; Products of Gas Manufacture; Impurities in Gas; Tar Products; Miscellaneous and Tables.

HANDBOOK OF CASINGHEAD GAS.

By Henry P. Westcott. Erie, Metric Metal Works, 1916. 9 + 274 pp., 5 x 8 in., illus., cloth. $2.50.

Methods, statistics, etc., intended to supply information on the processes used for extracting gasoline from natural gas. Based on visits to many existing plants and a study of their reports. Contents: General Physical Properties of Casinghead Gas Wells; Construction of Pipe Lines; Measuring Casinghead Gas; Gasoline Plant, Compression Method; Gasoline Plant, Absorption Method; Transportation of Gasoline; Miscellaneous.

GASOLINE AND HOW TO USE IT.

By G. A. Burrell. Bost., Oil Statistical Society, Inc., 1916. 281 pp., 6 x 4½ in., 1 illus., cloth. $1.50.

The preface states that the aim of this book is to provide an intelligent understanding of the use of gasoline, to assist the motorist and the farmer, and to give the history of gasoline and petroleum.

MODERN MILLING:

A Practical Manual on Milling Machines, Milling Accessories and Milling Operations. By Ernest Pull. N. Y., The Macmillan Co.; Lond., Whittaker & Co., 1917. 8 + 207 pp., 188 illus., 6 x 9 in., cloth. $3.00.

Universal and plain milling machines are described, as well as several special types, and their use for indexing, gear cutting and other operations is explained. Includes a chapter on speeds and feeds.

PLAIN AND ORNAMENTAL FORGING.

By Ernst Schwarzkopf. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1916. 10 + 267 pp., 228 illus., 5 x 8 in. $1.50.

Written to provide a really practical treatise on the theory and practice of art metal and blacksmith work, suitable for use as a text-book for beginners. Simple and detailed drawings illustrating each important operation are provided, together with full explanations. Intended especially for self-instruction. The author has had many years experience as a blacksmith and an instructor in forge work.

QUESTIONS AND ANSWERS RELATING TO MODERN AUTOMOBILE DESIGN, CONSTRUCTION, DRIVING AND REPAIR:

A Practical Treatise Consisting of Thirty-nine Lessons in the Form of Questions and Answers Written with Special Reference to the Requirements of the Non-Technical Reader Desiring Easily Understood Explanatory Matter Relating to All Branches of Automobiling. By Victor W. Page. Rev. and enl. ed. N. Y., The Norman W. Henley Publishing Co., 1917. 15 + 701 pp., 5 x 8 in., 397 illus., 3 pl., cloth. $1.50.

FARM MOTORS:

Steam and Gas Engines, Hydraulic and Electric Motors, Traction Engines, Automobiles, Animal Motors, Windmills. By Andrey Potter. 2d ed. rev. and enl. (Agricultural Engineering Series). N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 11 + 299 pp., 296 illus., 6 x 8 in., cloth. $1.50.

Includes the fundamental principles governing their construction, management and working. Intended for students of agricultural engineering and farmers. In the present edition the chapters on gas and oil engines and on traction engines have been enlarged, those on the steam engine rewritten, and chapters added on automobiles and animal motors.

THE MECHANISM OF THE LINOTYPE:

A Complete and Practical Treatise on the Installation, Operation and Care of the Linotype, for the Novice as well as the Experienced Operator. By John S. Thompson. 6th ed. rev. Chic., The Inland Printer Co., 1916. 10 + 280 pp., 7 x 5 in., 77 illus., 1 por., leather. $2.00.

The present edition of this text-book embodies all the improvements made in the linotype to the present time. A brief sketch is given of Ottmar Mergenthaler, the inventor of the linotype.

A HANDBOOK OF BRIQUETTING.

By G. Franke. Translated by Fred C. A. H. Lantsberry. Vol. 1, The Briquetting of Coals, Brown Coals, and Other Fuel. Phila., J. B. Lippincott Co.; Lond., Charles Griffin and Co., Ltd., 1917. 19 + 631 pp., 9 x 6 in., 225 illus., 9 pl., cloth. $9.00.

This book is not only intended as a handbook for those engaged in the industry, but can be used as a text-book in schools of mining and metallurgy and technical

high schools. The translator adds that the object of the translation is to put in the possession of English industrial leaders, knowledge which other countries have been compelled to acquire.

COMPRESSED AIR FOR THE METAL WORKER.

By Charles A. Hirschberg. N. Y., The Clark Book Co., 1917. 321 pp., 294 illus., 5 x 8 in., cloth. $3.00.

Describes the various purposes for which compressed air is used in power plants, foundries, machine shops, forge shops, etc. The various types of tools and machines are illustrated, as well as the commercial forms of air compressors. A compendium of present-day methods of utilizing compressed air, confined entirely to practice and omitting theory.

THE WORLD'S MINERALS.

By Leonard J. Spencer, with an Appendix by W. D. H. Hamman. N. Y., Frederick A. Stokes Co., 1916. 11 + 327 pp., 8 x 6 in., 40 pl., 21 diagrams, cloth. $2.75.

An attempt to present a popular and readable account, in the main confined to the 116 species of the more common simple minerals, which will help the student collector to identify his own specimens. Forty color-plates are included.

CHEMICAL TESTS FOR MINERALS.

By Arthur J. Burdick. Beaumont, Cal., The Gateway Publishing Co., 1917. 93 pp., 5 x 8 in., cloth. $1.25.

Handbook of simple qualitative tests, intended to enable prospectors without chemical training to identify the various rocks and ores met with in the field.

MICROSCOPIC EXAMINATION OF STEEL.

By Henry Fay. (Wiley Engineering Series No. 3.) N. Y., John Wiley & Sons; Lond., Chapman & Hall, Ltd., 1917. 18 pp., 9 x 6 in., 32 pl., cloth. $1.25.

The material contained in this volume was originally issued by the Ordnance Department, U. S. A., and was intended for the exclusive use of inspectors of ordnance material, but is now published for the use of others interested in the inspection of steel. It is meant only to present a mere outline of metallographic methods illustrating typical examples, but is not for use as a text-book. It is intended particularly for those who are in need of help in the interpretation of results. Over two-thirds of the volume consists of full-page plates.

THE STORY OF BETHLEHEM STEEL.

By Arundel Cotter. N. Y., The Moody Magazine and Book Co., 1916. 65 pp., 7½ x 5 in., 8 pl., cloth. 75 cents.

Contents: Town Founded by Moravian Colonists; When Schwab Went Down to Bethlehem; Bethlehem and the War Stock Boom; Schwab's Theories.

TUBE MILLING:

A Treatise on the Practical Application of the Tube Mill to Metallurgical Problems. By Algernon Del Mar. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 10 + 159 pp., 6 x 9 in., 70 illus., 1 pl., cloth. $2.00.

Covers the use of the conical and cylindrical tube mills for grinding ores, indicating in detail the best means of obtaining capacity at the least cost, and describing recent installations. It is, the author states, the only book entirely devoted to the subject. Contents: General Description; Amalgamating with the Tube; Grinding Ores with the Tube Mill for Flotation; Crushing Efficiencies; The Use of Wrought Iron and Alloy Steel; Appendix.

FRYE'S TABLES FOR ASCERTAINING THE VALUE OF GOLD-QUARTZ SPECIMENS.

By Jason S. Frye. Downieville, Cal., Jason S. Frye (privately printed), 1916. 56 pp., 4 x 3 in., leather. $1. (Gift of the author.)

Vest-pocket book of tables for finding the percentage of gold and the value per ounce from the specific gravity of gold-quartz specimens containing different amounts of gold.

STRESSES IN WIRE-WRAPPED GUNS AND IN GUN CARRIAGES.

By Lieut. Col. Colden L'H. Ruggles. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1916. 11 + 259 pp., 9 x 6 in., cloth. $3.00.

Explains a number of the important engineering principles underlying the design of wire-wrapped guns and of gun carriages. Originally prepared for the use of the cadets of the U. S. Military Academy. Contents: Elastic Strength of Wire-Wrapped Guns; Determination of the Forces Brought upon the Principal Parts of the 3-Inch Field Carriage and a Disappearing Gun Carriage by the Discharge of the Gun; Stresses in Parts of Gun Carriages; Toothed Gearing; Counter Recoil Springs.

BATTLE FIRE TRAINING.

By Capt. G. S. Turner and Capt. J. J. Fulmer. Menasha, Wis., George Banta Publishing Co. 294 pp., 47 illus., 4 x 7 in., cloth. $1.00.

Calls attention to the existing necessity for the adoption in our army of a uniform system of collective training in battle fire, and offers a system based upon the principles laid down in the manuals upon fire and fire tactics published by the War Department.

ENGINEERING ANALYSIS OF A MINING SHARE.

By J. C. Pickering. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 8 + 95 pp., 9 x 6 in., cloth. $1.50. (Gift of the author.)

An endeavor to set forth the considerations which enter logically into the analysis of a mining venture, approached from an engineering viewpoint. Contents: Classification of Mining Properties; Development Companies; Elements to be Considered in the Analysis of a Mining Report; Operating Profits *vs.* Dividends; Determination of the Value of a Mine or Mining Share; Valuing Mine Products; World's Gold Production with a Review of the World's Greatest Gold-field; Mining *vs.* Industrial and other Types of Investments with an Analysis of the Affairs of Typical Mining Companies.

COMPRESSED AIR PRACTICE IN MINING.

By David Penman. Phila., J. B. Lippincott Co.; Lond., Charles Griffin & Co., Ltd., 1917. 221 pp., 113 illus., 5 x 8 in., cloth.

Text-book for use in mining schools, but also useful, it is hoped, to those in practice. Discusses air-compressors, methods of transmitting power and the use for compressed air for coal cutting, conveyors, drills, etc. A comparison of the advantages of compressed air and other means of transmitting power in mines is given.

MINE GASES AND VENTILATION:

A Reference Handbook Combining Theory and Practice of Coal Mining: Designed to Meet the Needs of all Students of Coal Mining, Including Mining Engineers, Mine Superintendents, Foremen, Firebosses, Shotfirers, and Miners Preparing for Examination for Certificates of Competency. By J. T. Beard. N. Y., Hill Publishing Co., 1916. 206 pp., 7 x 5 in., flexible cloth. $2.00. (Gift of the author.)

Composed of material on the atmosphere, gases and ventilation of mines, which has appeared in pocket-book form, in the "Study Course in Coal Mining" Department of *Coal Age* since March, 1913, and which was prepared in response to requests from coal miners who wished to know the development of formulas, the explanation of principles and the most approved and generally adopted methods. Contents: Air; Heat; Mine Gases; Theory of Ventilation; Practical Ventilation; Addenda.

PRINTING TRADES BLUE BOOK 1917.

N. Y. and Chic., A. F. Lewis & Co., 1917. 543 pp., 6 x 8 in., cloth. $3.00.

Directory of printers, dealers in paper machinery, metals, type, etc. in New York and surrounding towns. Arranged alphabetically, by telephone numbers and by classes. Includes directories of paper brands and of printing associations, unions and clubs.

HENDRICKS' COMMERCIAL REGISTER OF THE UNITED STATES:

For Buyers and Sellers. Twenty-fifth Annual Edition. N. Y., S. E. Hendricks Co., Inc., 1916. 1738 pp., 8 x 10 in., illus., cloth. $10.00.

A directory of producers, manufacturers, dealers and consumers connected with the architectural, contracting, electrical, engineering, hardware, iron, mechanical, mill, mining, quarrying, railroad, steel and kindred industries.

HEATON'S ANNUAL;

The Commercial Handbook of Canada and Boards of Trade Register, 13th Year, 1917. Toronto, Heaton's Agency, 1917. 518 pp., 5 x 7 in., cloth. $1.25.

Collects in one volume the information of value to merchants and manufacturers. Includes lists of government officials, customs brokers, banking towns, registration offices, shipping directions, etc. The customs tariff and a digest of customs law and regulation are given. The work also contains much general information on the resources of the country, a gazetteer of commercial towns and an economic bibliography of governmental reports, together with the usual tables.

THE WOOL INDUSTRY;

Commercial Problems of the American Woolen and Worsted Manufacture. By Paul T. Cherington. N. Y., Chic., Lond., A. W. Shaw Co. (copyright 1916). 16 + 261 pp., 5 x 8 in., cloth. $2.50.

The author's purpose has been to present the results of an examination of the industries producing woolen and worsted fabrics, approached from the side of their buying and selling problems. Omits other features of the industry, such as wool-growing, tariff relations, manufacturing technique, etc.

A DISCUSSION OF THE PRINCIPLES AND PRACTICE UNDERLYING CHARGES FOR WATER, GAS, ELECTRICITY, COMMUNICATION AND TRANSPORTATION SERVICES.

By Harry Barker. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 14 + 387 pp., 9 x 6 in., cloth. $4.00.

The author's aim has been to present, concisely and impartially, and as far as possible, in non-technical language, the diverse phases of rate-making for public utilities, including a comprehensive discussion of (1) such corporation and municipal activities as affect service and rates; (2) the trend of public opinion and Court and commission decisions; and (3) the most important engineering and economic problems involved, with the hope that it will prove of service to lawyers and legislators, to editorial writers of the daily press, to students of municipal affairs, and to the general public. Contents: Development of Utility Regulation, Utility Privileges and Obligations, Rights of the Public; Product and Service Companies, Some Definitions of Rates and Services; Various Bases for Rates; Details of the Cost-of-Service Study of Rates, Test for Fixed and Operating Charges; Fair Value of a Utility Property; Valuation as an Engineering Task, Appraisal of Land and Water Rights; Reasonable Return, Interest, Compensation for Risk and Attention, Extra Profits; Depreciation as it Affects Utility Rates; Miscellaneous Problems Indirectly Related to Rate-Making; Problems of Railway Rates; Problems of Express Transportation Rates; Rate Problems of Street and Interurban Railway Transportation; Problems of Water Rates; Rate Problems of Gas Utilities; Rate Problems of Electricity Supply Works; Problems of Telephone Rate-Making; Appendix A. B. C. D.

VALUATION, DEPRECIATION AND THE RATE-BASE.

By Carl Ewald Grunsky and Carl Ewald Grunsky, Jr. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 8 + 387 pp., 9 x 6 in., cloth. $4.00. (Gift of the author and publisher.)

The author states that this book is the result of personal contact with the valuation problem. Special consideration has been given to a discussion of the non-agreement of the actual life of articles which have a limited period of usefulness with their probable or normal life. The tables included are not only intended for valuation engineers, but for any one having problems of finance and bonding to solve. Contents: Introduction and General Notes; Definitions; Fundamental Principles; Essentials of Value; Elements Which Reduce Value; The Effect of the Non-Agreement Between Actual and Probable Life Upon the Determination of Depreciation; The Purpose of the Appraisal; The Fixing of Rates; Possible Procedures when the Rates for a Public Service are to be Fixed; Notes on the Determination of the Value of Real Estate in Eminent Domain Proceedings and for Rate Fixing Purposes; The Value of a Water-Right and of Reservoir and Watershed Lands; The Accounting System; The Valuation of Mines and Oil Properties by C. E. Grunsky, Jr.; Tables.

THE TAYLOR SYSTEM OF SCIENTIFIC MANAGEMENT.

By C. Bertrand Thompson. N. Y., Chic., Lond., A. W. Shaw Co. (copyright 1917). 175 pp., 22 illus., 5 diagrams, 9 x 11 in., flexible cloth. $10.00.

Intended to give, in addition to the history and theory of the system, enough development and operation to enable the factory manager to visualize the system in some detail, to distinguish clearly between it and other systems, and to understand its principles and mechanisms as found in actual practice. Based on personal investigations of all the installations of the system between Maine, Maryland and Chicago. Contains a bibliography of the important publications on the system.

INDUSTRIAL PREPAREDNESS.

By C. E. Knoeppel. N. Y., The Engineering Magazine Co., 1916. 6 + 145 pp., 8 x 5 in., cloth. $1.00.

A study of Germany's military and industrial preparedness intended to point the way to national greatness through the right kind of social, industrial and military preparedness.

HOW TO FIND FACTORY COSTS:

By C. Bertrand Thompson. Chic., N. Y., Lond., A. W. Shaw Co. 191 pp., 10 x 7 in., 51 charts, 1 diagram, 1 tab., cloth. $3.00.

It is stated that this book is broad enough to apply to all kinds of industries, and is intended to be useful to the accountant as well as the factory head.

WORKMEN'S COMPENSATION LAW:

Personal Injury by Accident Arising Out of and in the Course of the Employment. By P. Tecumseh Sherman. N. Y., Workmen's Compensation Publicity Bureau (copyright 1916). 67 pp., 6 x 9 in., paper. $2.00.

A compilation of the decisions construing the British law on the subject, with abbreviated summaries of the relevant portions of the French and German laws. These precedents will be useful, the author believes, in defining the meaning of "accidents due to risk of work" as used in the American statutes.

THE ESSENTIALS OF AMERICAN TIMBER LAW.

By J. P. Kinney. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 19 + 279 + 10 pp. 6 x 9 in., cloth. $3.00.

A presentation of the existing law regarding trees and their products as property, with such observations and references to historical development as are considered necessary to an understanding of the reasons for the law. Citations to the sections of the compiled or session laws of the different States enables the reader to find the various statutes in full. Especial prominence is given to interpretations of the law by the Courts.

THE THEORY AND PRACTICE OF WORKING PLANS.

(Forest Organization). By A. B. Recknagel. 2d ed., rev. N. Y., John Wiley & Sons; Lond., Chapman & Hall, Ltd., 1917. 14 + 265 pp., 14 illus., 6 pl., 1 tab., 6 x 9 in., cloth. $2.00.

An adaptation of the best European efforts in forest organization to the present needs of American forestry, intended for the practising forester as well as the student. The nomenclature of this edition has been revised in accordance with the suggestions of the Committee on Terminology of the Society of American Foresters, and the text as a whole has been revised and extended.

ANNUAL CHEMICAL DIRECTORY OF THE UNITED STATES.

B. F. Lovelace, Editor. Baltimore, Williams & Wilkins Co. (copyright 1917). 305 pp., 6 x 9 in., cloth. $5.00.

First issue. Includes American manufacturers of and dealers in chemical apparatus and equipment; and professional chemical firms and laboratories. Lists of colleges offering instruction in chemistry, experiment stations, technical and scientific societies are given, also of Federal and State officials of dairying, foods, drugs, etc. Bibliographies of American and foreign journals and important books of the year, with a concise review of new happenings, devices, methods and appliances conclude the book.

HANDBOOK OF CHEMISTRY AND PHYSICS:

A Ready-Reference Pocket Book of Chemical and Physical Data. 5th ed. Cleveland, The Chemical Rubber Co., 1917. 414 pp., 4 x 7 in., cloth. $2.00.

The present edition of this convenient reference book has been carefully revised, many new tables have been added, and the index has been enlarged.

A TEXT-BOOK OF INORGANIC CHEMISTRY.

Edited by J. Newton Friend. Vol. VIII: The Halogens and Their Allies. By Geoffrey Martin and E. A. Dancaster. Lond., Charles Griffin & Co., Ltd., 1915. 18 + 337 pp., 30 illus., 1 tab., 6 x 9 in., cloth. $3.00. (Gift of J. B. Lippincott.)

A concise general account of the chief chemical and physical properties of fluorine, chlorine, bromine, iodine, and manganese, and their compounds. Describes the most important manufacturing operations briefly. The work does not attempt to be exhaustive, but is provided with very numerous references to original publications on the various phases of the subjects dealt with.

ELEMENTARY CHEMICAL MICROSCOPY.

By Emile Monnin Chamot. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1916. 13 + 410 pp., 147 illus., 6 x 9 in., cloth. $3.00.

The author believes that the American chemist has failed to appreciate the benefits to be obtained by the application of chemical microscopic methods in the industries and in research. This book is written to instruct him in the manipulation of the microscope and in the great variety of problems which may be solved by its use, and to call attention to the fields in which it is especially useful.

OUTLINES OF INDUSTRIAL CHEMISTRY:

A Text-Book for Students. By Frank Hall Thorp, with Assistance in Revision from Warren K. Lewis. 3d ed. rev. and enl. N. Y., The Macmillan Co., 1916. 25 + 665 pp., 137 illus., 6 x 9 in., cloth. $3.75.

The present edition of this well-known treatise has been thoroughly revised, many sections having been rewritten and much obsolete matter replaced by new material. The modern concepts and theories of chemistry have been introduced whenever these promised to make clearer the phenomena involved.

GENERAL INSTRUCTIONS AND METHODS OF ANALYSIS AND CHEMICAL CONTROL FOR USE IN THE FACTORIES OF THE CUBAN-AMERICAN SUGAR COMPANY.

By Guilford L. Spencer. N. Y., The Cuban American Sugar Company, 1916. 39 pp., 8½ x 6 in., paper. $1.00.

The purpose of this book is to supply methods that are applicable in all the company's factories, in obtaining the data required for report sheets and permanent records. Definitions of terms used by the company are included.

A HANDBOOK FOR CANE-SUGAR MANUFACTURERS AND THEIR CHEMISTS.

By Guilford L. Spencer. 5th ed. enl. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1916. 15 + 529 pp., 7 x 4 in., 83 illus., 1 pl., leather. $3.50.

The book is divided into two parts; Manufacture of Cane-Sugar, and Sugar Analysis; a chapter is also included on sugar refining as practised in the United States. The chemical section of the book has been revised to meet the conditions of the very large factories now in operation.

THE LIFE OF ROBERT HARE:

An American Chemist (1781-1858). By Robert Fahs Smith, Provost of the University of Pennsylvania. Phila. and Lond., J. B. Lippincott Co., 1917. 508 pp., 1 por., 4 illus., 6 x 9 in., cloth. $5.00.

Assembles the labors of Robert Hare in such a form as to acquaint students of chemistry with him, and to show his title to an exalted place in the history of chemistry in this country. Told largely by hitherto unpublished letters and documents collected from forgotten journals and pamphlets.

HOW TO STUDY.

By George Fillmore Swain. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 10 + 65 pp., 5 x 7 in., paper. 25 cents.

Dr. Swain's little monograph is intended to formulate, briefly and simply, certain fundamental principles of study and to point the way to proper habits and methods. Intended for students in and graduates of technical schools. Contents: Introduction; The Proper Mental Attitude; Studying Understandingly; System; Mental Initiative; Habits of Work; Suggestions to Teachers.

ARITHMETIC FOR ENGINEERS;

Including Simple Algebra, Mensuration, Logarithms, Graphs, and the Slide Rule. By Charles B. Clapham. (The D. U. Technical Series.) N. Y., E. P. Dutton & Co. (preface 1916). 436 pp., 149 illus., 6 x 9 in., cloth. $3.00.

The author's object is to treat the subject with sufficient detail and enough engineering application to provide a truly practical treatise, omitting all subjects which have only academic interest.

APPLIED MECHANICS.

By Alfred Poorman. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 11 + 244 pp., 321 illus., 6 x 9 in., cloth. $2.00.

A text-book for undergraduate courses in engineering schools, in which the basic principles have been developed in a way which the average student can follow easily and illustrations showing clearly the application of such principles to the solution of engineering problems have been provided. Extended use has been made of the graphic method of solution.

LAWS OF PHYSICAL SCIENCE.

A Reference Book. By Edwin F. Northrup. Phila. and Lond., J. B. Lippincott Co., 1917. 7 + 210 pp., 5 x 8 in., leather. $2.00.

A summary of the general propositions underlying physical science and engineering, classified for convenience in consultation. Each law is accompanied by one or more references to more extended information. A bibliography is included.

FRENCH MEASURE AND ENGLISH EQUIVALENTS.

By John Brook. N. Y., Spon & Chamberlain; Lond., E. & F. N. Spon, 1917. 7 + 80 pp., 4 x 3 in. 40 cents.

Vest-pocket size. Gives the English equivalents of the metric measures of length and weight and of the old French, Prussian, Austrian, and Russian measures of length. A table for reducing the usual vulgar fractions of the inch to decimals is also given. The English equivalents are given in decimal fractions, correct to six places, and approximately in vulgar fractions as well. Intended for engineers, manufacturers, and workmen.

MUNICIPAL ENGINEERING PRACTICE.

By A. Prescott Folwell. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1916. 11 + 422 pp., 9 x 6 in., 112 illus., 1 pl., cloth. $3.50.

This book has been written to treat at greater length practical information concerning street cleaning, public comfort stations and other subjects not treated in most of the text-books on municipal engineering. Contents: Fundamental Data; The City Plan; Street Surface Details; Bridges and Waterways; City Surveying; Street Lights, Signs and Numbers; Street Cleaning and Sprinkling; Disposing of City Wastes; Markets, Comfort Stations and Baths; Parks, Cemeteries and Shade Trees.

MUNICIPAL ACCOUNTING.

By DeWitt Carl Eggleston. N. Y., The Ronald Press Co., 1914. 22 + 456 pp., 9 x 6 in., 113 diagrams, ½ leather. $4.00.

Intended to furnish practising accountants, municipal accountants and students with a complete method of municipal accounting, representing the best modern practice. The methods described are intended for the larger cities, but a special chapter on accounting for smaller cities is included. Many of the methods used in New York are presented.

INSTRUCTIONS TO LOCATING ENGINEERS AND FIELD PARTIES.

By F. Lavis. N. Y., McGraw-Hill Book Co., Inc. (copyright 1916). 44 pp., 9 x 6 in., 9 diagrams, cloth. $1.00. (Gift of the author.)

Reproduced in abridged form from "Railroad Location Surveys and Estimates." Originally prepared for the use of field parties working under his direction in the United States, afterwards modified for use in South America, and finally prepared in the present form for use in China. They are intended to secure uniform practice in making surveys and in the compilation of the results in the form of maps, estimates, etc.

WINTER TRACK WORK.

By E. R. Lewis. Chic., Railway Educational Press, Inc. (copyright 1917). 166 pp., 21 illus., 5 x 8 in., cloth. $1.60.

Explains practical methods for maintaining railway track. Intended for use of trackmen. Contents: Climate and Track; Frost; Snow; Shims and Shimming; Winter Track Force, Tools and Supplies; Snow Fences and Snow Sheds; Snow Handling Equipment; Spring Floods; Storing Ice; Organization.

RAILWAY TRACK ECONOMICS.

A Tabloid Treatise Upon Railroad Problems. By August E. Liebmann. rev. ed. Chic. (privately printed), 1916. 66 pp., 6½ x 5 in., leather. $3.00. (Gift of the author.)

The author states that he presents in tabloid form some criticism and recommendations for solving the problems of maintenance costs.

ELECTRIC TRACTION:

A Treatise on the Application of Electric Power to Tramways and Railways. By A. T. Dover. N. Y., and Lond., Whittaker & Co., 1917. 18 + 667 pp., 9 x 6 in., 518 illus., 5 pl., cloth.

Intended for engineers and advanced students. Representative examples of modern tramway and railway practice are included, but detailed accounts of electrification have been omitted and generating stations and transmission lines have not been considered. Contains a bibliography on electrification, and a number of worked examples have been included in the text. Contents: Mechanics of Train Movements; Motors; Control; Auxiliary Apparatus; Rolling Stock; Detailed Study of Train Movement; Track and Overhead Construction; Distributing Systems and Sub-stations.

ELECTRIC RAILWAY TRANSPORTATION.

By Henry W. Blake and Walter Jackson. N. Y., The McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 7 + 487 pp., 120 illus., 6 x 9 in., cloth. $5.00.

The first book, the authors state, devoted to transportation methods and practice. Largely compiled to put in convenient form matter which has appeared in the *Transactions* of the American Electric Railway Transportation and Traffic Association and in the electric railway periodicals. Contents: Organization and Definitions; Adjustment of Service to Traffic; Accelerating Traffic Movement Along the Line; Accelerating Traffic Movement on the Car; Car Types in Relation to Traffic; City Timetables-Preliminaries; Interurban Schedules and Dispatching; Fares; Fare Collection Practices and Devices; Public Relations; Promotion of Passenger Traffic; Traffic Signs for Cars, Station and Road-Information for the Public; Competition; Freight and Express Business; Selection and Training of Men; Wages and Wage Agreements; Welfare Work; Discipline of Trainmen; Forms of Extra Pay.

INTERBOROUGH FINANCE:

Present and Future with Especial Reference to Conditions When the New Lines shall have been Completed. Including Synopsis of the Financial Structure of Interborough Consolidated Corporation. N. Y., Van Emburgh & Atterbury, 1917. 69 pp., 2 maps, 2 diagrams, 6 x 9 in., leather.

Contents: Interborough Consolidated Corporation; Interborough Rapid Transit Company; New York Railways Company; Partnership Between Interborough and City of New York; Will the Interborough Earn its Preferentials.

LABORATORY MANUAL OF BITUMINOUS MATERIALS:

For the Use of Students in Highway Engineering. By Prevost Hubbard. N. Y., John Wiley & Sons; Lond., Chapman & Hall, Ltd., 1916. 11 + 153 pp., 9 x 6 in., 38 illus., cloth. $1.50.

Certain fundamentals not strictly a part of laboratory work have been included as a guide to students not well versed in the nomenclature, classification, and uses of bituminous materials.

A TEXT-BOOK ON BRICK PAVEMENTS:

By Clark R. Mandigo. Kansas City, Western Paving Brick Manufacturers Association, 1917. 126 pp., 42 illus., 5 x 8 in., cloth. $1.50.

Intended for municipal officers, commissioners and citizens as well as for city and county engineers and contractors. Descriptive rather than technical, but intended to give accurate information of interest to all concerned in road improvement. Contents: Brick Pavements; Highway Economics; The Sub-Grade and the Foundation; Manufacture of Brick; Paving Problems; Appendix: Standard Specifications.

THE VENTILATION HANDBOOK:

The Principles and Practice of Ventilation as Applied to Furnace Heating; Ducts, Flues and Dampers for Gravity Heating; Fans and

Fan Work for Ventilation and Hot Blast Heating. By Charles L. Hubbard. N. Y., Sheet Metal Publishing Co., 1916. 218 pp., 8 x 6 in., 137 illus., cloth. $2.00.

A series of questions, answers and descriptions, with illustrations, arranged from a series of articles prepared for *Sheet Metal*. Care has been taken to keep all descriptions and mathematical work well within the understanding of the student and beginner.

PRACTICAL SHEET METAL DUCT CONSTRUCTION:

A Treatise in the Construction and Erection of Heating and Ventilating Ducts. By William Neubecker. N. Y., The Sheet Metal Publishing Co., 1916. 194 pp., 8 x 6 in., 217 illus., cloth. $2.00.

The plan of the present work is to take up each operation, and by means of descriptions (usually illustrated) to show all operations incident to the construction and erection of heating and ventilating ducts.

GRAY'S PLUMBING DESIGN AND INSTALLATION.

By William Beall Gray. N. Y., David Williams Co., 1916. 559 pp., 500 illus., 6 x 9 in., cloth. $4.00. (Gift of U. P. C. Book Co.)

A reference work for plumbers, intended to illustrate fully standard American practice in all branches of the plumbing and allied trades.

STATE SANITATION:

A Review of the Work of the Massachusetts State Board of Health. By George Chandler Whipple. Cambridge, Harvard University Press; Lond., Oxford University Press, 1917. 11 + 377 pp., 12 pl., 8 diagrams, 6 x 9 in., cloth. $2.50.

The first of a three-volume history; intended to set forth the past work of the Board, to reprint selected articles of importance from the older reports and abstracts of the others, and to serve as an index and guide to the annual reports. Biographical sketches of the engineers, chemists, and biologists of the Board will be included. Volume one contains the history of the Board since its establishment in 1869, together with an abridged version of the "Report of the Massachusetts Sanitary Commission of 1850."

A MANUAL OF FIRE PREVENTION AND FIRE PROTECTION FOR HOSPITALS.

By Otto R. Eichel. N. Y., John Wiley & Sons; Lond., Chapman & Hall, Ltd., 1916. 5 + 69 pp., 7½ x 5 in., cloth. $1.00.

An outline of the principles of fire prevention and protection, with indications for their application in institutions housing the sick, based on the personal observation and study of the author, who is Director of the Division of Sanitary Supervisors, New York State Department of Health.

FIRE PREVENTION AND PROTECTION;

A Compilation of Insurance Regulations Covering Modern Restrictions on Hazards and Suggested Improvements in Building Construction and Fire Prevention and Extinguishment. By A. C. Hutson, Fire Protection Engineer. 3d ed. completely rev. N. Y. and Chic., The Spectator Co., 1916. 7 + 777 pp., 126 illus., 3 pl., 5 x 7 in., leather. $4.25.

Written especially for merchants, manufacturers and underwriters, as a succinct presentation of the knowledge necessary to attain as complete protection as possible from fire. Covers all the suggested regulations of the National Board of Fire Underwriters and allied organizations.

ELLIOTT'S WEIGHTS OF STEEL;

For Engineers, Architects, Contractors, Builders, Steel Manufacturers, and all Users of Rolled Steel. Computed by Thomas J. Elliott. Cleveland, The Penton Publishing Co., 1916. 662 pp., 6 x 9 in., leather. $20.00.

Given the weight of a linear foot of any section of rolled steel, this book of tables enables one to find the weight of a single piece of any length without performing the operation of multiplication.

BUILDING SUPERINTENDENCE FOR STEEL STRUCTURES;

A Practical Work on the Duties of a Building Superintendent for Steel-Frame Buildings and the Proper Methods of Handling the Materials and Construction. By Edgar S. Belden. Chic., American Technical Society, 1917. 95 pp., 25 illus., 2 pl., 5 x 8 in., cloth. $1.00.

Concise practical discussion of the problems which confront the superintendent of structural steel construction, and of the proper methods of meeting them.

STRESSES IN STRUCTURES.

By A. H. Heller. Rev. by Clyde T. Morris. 3d ed. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1916. 13 + 374 pp., 230 illus., 6 x 9 in., cloth. $2.75.

Author has attempted to provide a book which, without being an exhaustive scientific treatise on stresses, would be a suitable text-book for students and also a concise reference book for engineers. In the present edition various explanations have been expanded, numerical illustrative examples have been added and new material introduced where the reviser has found it necessary.

MODERN UNDERPINNING:

Development, Methods and Typical Examples. By Lazarus White and Edmund Astley Prentis, Jr. (Wiley Engineering Series No. 2.) N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 12 + 94 pp., 9 x 6 in., 48 illus., 1 pl., cloth. $1.50.

Intended to exhibit, by means of photographs and drawings, the essential steps in underpinning as illustrated by the methods used in subway construction in New York City. Only enough text to supplement the illustrations included. Contents: General Aspects; Development of Underpinning and Methods; Shores, Needles, and Foundation Reinforcements; Specific Examples of Underpinning; Appendix.

THE INDUSTRIAL AND ARTISTIC TECHNOLOGY OF PAINT AND VARNISH.

By Alvah Horton Sabin. 2d ed. rev. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 10 + 473 pp., 9 x 6 in., 10 pl., 10 illus., cloth. $3.50.

Written to give a correct general outline of the subject, with a brief account of the modern use of paints and varnishes, and of the principles involved in their fabrication and application. This edition is nearly one-third larger than the first one and takes cognizance of the changes in the character of the cheaper varnishes due to the use of tung oil.

ARCHITECTURAL DRAWING AND LETTERING;

A Manual of Practical Instruction in the Art of Drafting and Lettering for Architectural Purposes, Including the Principles of Shading and Rendering and Practical Exercises in Design. Part 1, Architectural Drawing. By Frank A. Bourne and H. V. Von Holst. Part 2, Architectural Lettering. By Frank Choteau Brown. Chic., American Technical Society, 1917. 102 + 48 pp., 94 illus., 6 x 8 in., cloth. $1.50.

* This is an elementary work presenting the art in logical manner.

MILITARY SKETCHING AND MAP READING.

By Capt. Loren C. Grieves. Wash., U. S. Infantry Assoc., 1917. 95 pp., 32 illus., 6 x 9 in., cloth. $1.00.

A text-book intended for officers of the National Guard, candidates for commissions in the Army and the Reserve Officers' Training Corps and for educational institutions. Meets the provisions prescribed by the War Department.

TOPOGRAPHICAL DRAWING.

By Edwin R. Stuart. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 126 pp., 54 illus., 1 map, 6 x 9 in., cloth. $2.00.

Intended to furnish a satisfactory standard of practice in topographical drawing which will combine good execution with economy of time. Contents: Introductory; Map Projection; Instruments and Drawing Materials; Plotting; Special Methods in Free-Hand Drawing; Practice in Topographical Drawing; Lettering; Conventional Signs; Map Drawing.

THE BAROMETRICAL DETERMINATION OF HEIGHTS:

A Practical Method of Barometrical Levelling and Hypsometry for Surveyors and Mountain Climbers. By F. J. B. Cordeiro. 2d ed. rev. and enl. N. Y., Spon & Chamberlain; Lond., E. & F. N. Spon, Ltd., 1917. 26 pp., 7 x 4 in., cloth. 50 cents.

This little volume was an essay originally entered in the Hodgkins Prize Competition held under the auspices of the Smithsonian Institution, and was awarded honorable mention.

AZIMUTH.

By George L. Hosmer. 2d ed. rev. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1916. 5 + 73 pp., 5 x 7 in., 6 illus., leather. $1.00.

This handbook is intended to present in compact form certain approximate methods of determining the true bearing of a line, together with the necessary rules and tables arranged in a simple manner so that they will be useful to the practical surveyor. This edition contains a new method for finding the azimuth by an observation on the pole star at any hour angle when the local time is known. The tables of the sun's declination have been extended to 1919, and new star maps are given.

STANDARD METHODS FOR THE EXAMINATION OF WATER AND SEWAGE.

By the American Public Health Association. 3d ed. Bost., American Public Health Association, 1917. 115 pp., 10 x 7 in., 1 illus., cloth. $1.25.

This volume is the result of the combined labors of three committees namely: the Committees of the American Public Health Association; American Chemical Society; and the Association of Official Agricultural Chemists. The 1912 edition has been modified by the addition of methods for the examination of sewage sludge and muds, the analysis of chemicals used in the treatment of water, and the determination of chlorine. Changes also have been made in the technique of existing methods. Bacteriological, chemical and microscopical bibliographies are included.

WATER PURIFICATION.

By Joseph W. Ellms. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 10 + 485 pp., 149 illus., 6 x 9 in., cloth. $5.00.

Intended as a fairly complete account of the development of the art. Includes a consideration of the properties of various classes of waters and gives especial attention to the relation of polluted public water supplies to water-borne diseases. Describes in considerable detail the various steps in purification processes, such as

sedimentation, coagulation, filtration and disenfection. Contains chapters on water softening and on the removal of iron and manganese from ground-water supplies. Bibliographical references accompany each chapter.

USE OF WATER IN IRRIGATION.

By Samuel Fortier. 2d ed. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1916. 16 + 325 pp., 8 x 6 in., 75 illus., 8 pl., cloth. $2.00.

The first edition, which appeared in 1914, dealt with the agricultural side of irrigation. In the present edition the article on the measurement of water has been revised and enlarged, and a new one added on sewage irrigation. A new chapter on the "Use of Water in Foreign Countries" is a most important addition to the book. Contents: Introduction; The Irrigated Farm; The Necessary Equipment and Structures; Methods of Preparing Land and Applying Water; Waste Measurement; Delivery and Duty of Water; Irrigation of Staple Crops; Use of Water in Foreign Countries.

IRRIGATION WORKS CONSTRUCTED BY THE UNITED STATES GOVERNMENT.

By Arthur Powell Davis. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 16 + 413 pp., 128 illus., 6 x 9 in., cloth. $4.50.

Contains engineering descriptions, with the necessary illustrations, of the various projects undertaken by the Reclamation Service. The projects described are the Salt River, the Yuma, the Orland, the Grand Valley, the Uncompahgre, the Boise, the Minidoka, the Huntley, the Lower Yellowstone, the North Platte, the Truckee-Carson, the Carlsbad, the Hondo, the Rio Grande, the Umatilla, the Klamath, the Belle Fourche, the Strawberry Valley, the Okanogan, the Yakima and the Shoshone. Intended for engineers and those interested in the development of arid lands.

RIVER DISCHARGE.

By John Clayton Hoyt and Nathan Clifford Grover. 4th ed. rev. and enl. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1916. 12 + 210 pp., 16 x 9 in., 23 illus., 7 pl., 2 maps, 1 diagram, tab., cloth. $2.00.

This edition has been revised and brought up to date. Chapter V, "Discussion and Use of Data" has been largely rewritten, and Chapter VI has been expanded to cover the field of hydrology. Contents: Introduction; Instruments and Equipment; Structures from Which Measurements are Made; Velocity-Area-Stations; Weir Stations; Discussion and Use of Data; Hydrology as Related to Stream Flow.

THE PANAMA CANAL AND COMMERCE.

By Emory R. Johnson. N. Y. and Lond., D. Appleton & Co., 1916. 295 pp., 8 illus., 7 maps, 5 x 7 in., cloth. $2.00.

Explains the reasons for the building of the canal and discusses the use of the waterway by the commerce and shipping of the United States and other countries. Intended for those engaged in shipping and other students of the canal in relation to commerce. A companion volume to Gorgas' "Sanitation in Panama" and Sibert and Stevens' "The Construction of the Canal."

MEMBERSHIP

(From May 4th to August 2d, 1917)

ADDITIONS

MEMBERS		Date of Membership.
ALLISON, JOSEPH CHESTER. Cons. Engr., 209 Anderson Bldg., Calexico, Cal.	Assoc. M. M.	Sept. 3, 1912 June 12, 1917
AYRES, LYONEL. Engr., City of Duluth, City Hall, Duluth, Minn.		June 11, 1917
BAKHMETEFF, BORIS ALEXANDROWITCH. 1014 Flatiron Bldg., New York City		Mar. 13, 1917
BARTLETT, CHARLES TERRELL. Cons. Engr. (Bartlett & Ranney, Inc.), 108 East Crockett St., San Antonio, Tex.	Assoc. M. M.	Jan. 2, 1912 July 12, 1917
BEGIEN, RALPH NORMAN. Gen. Mgr., B. & O. R. R., Room 507, B. & O. Bldg., Baltimore, Md.	Assoc. M. M.	June 7, 1905 Mar. 13, 1917
BENEDICT, FARRAND NORTHROP. Vice-Pres. and Engr., Thomas Crimmins Contr. Co.; Res., 33 South Maple Ave., East Orange, N. J.	Jun. Assoc. M. M.	June 4, 1907 May 2, 1911 May 15, 1917
BLACK, ERNEST BATEMAN. Cons. Engr. (Black & Veatch), 507 Inter-State Bldg., Kansas City, Mo.	Assoc. M. M.	Nov. 1, 1910 April 18, 1917
BLAIR, CLARENCE MOORE. 785 Edgewood Ave., New Haven, Conn.	Assoc. M. M.	Dec. 5, 1911 May 15, 1917
BOWIE, ALFRED WILLIAM. Engr. in Chg., Westinghouse, Church, Kerr & Co., 37 Wall St., New York City.		June 11, 1917
BRAUNE, GUSTAVE MAURICE. Associate Prof., Civ. Eng., Univ. of Cincinnati, 248 Loraine Ave., Cincinnati, Ohio.	Jun. Assoc. M. M.	June 2, 1896 Sept. 4, 1901 May 15, 1917
BRAUNWORTH, PERCY LEWIS. Borough Engr. of Roseland; Contr. Engr., 36 Spring St., Montclair, N. J.	Assoc. M. M.	Jan. 3, 1911 June 12, 1917
CAHILL, JOHN RICHARD. Gen. Contr., 110 Sutter St., San Francisco, Cal.	Jun. Assoc. M. M.	April 30, 1907 June 4, 1913 June 12, 1917
CARSTARPHEN, FREDERICK CHARLES. Tramway Engr., Am. Steel & Wire Co., Trenton, N. J.	Assoc. M. M.	April 6, 1909 May 15, 1917
CORTRIGHT, EDWIN KEEN. Res. Engr., Lawrence Central Bridge, 40 Lawrence St., Lawrence, Mass.	Jun. Assoc. M. M.	Feb. 4, 1908 April 30, 1912 June 12, 1917
CROMWELL, GEORGE. City Engr., 4318 Sierra Vista St., San Diego, Cal.	Assoc. M. M.	Oct. 3, 1911 June 12, 1917
CUDEBEC, ALBERT BENNETT. Special Eng. Investigator, Elec. Bond & Share Co., 71 Broadway, New York City.		May 15, 1917

MEMBERS (*Continued*)

		Date of Membership.
CURD, WILLIAM CANTRILL. Contr. Engr., R. R. Dept., Layne & Bowler Co., Randolph Bldg., Memphis, Tenn.		June 11, 1917
DAVIES, JOHN PERCIVAL. Office Engr., Honolulu Iron Works Co., Woolworth Bldg., New York City	Assoc. M. M.	May 2, 1911 May 15, 1917
DEWELL, HENRY DIEVENDORF. 58 Sutter St., San Francisco, Cal	Assoc. M. M.	May 2, 1911 June 12, 1917
DICKINSON, WILLIAM DEWOODY. Cons. Engr. (Dickinson & Watkins), 610 State Bank Bldg., Little Rock, Ark	Assoc. M. M.	May 3, 1910 June 12, 1917
ELAM, WILLIAM EARLE. Asst. Engr., Mississippi Levee Board, Greenville, Miss	Jun. Assoc. M. M.	Feb. 6, 1906 Oct. 31, 1911 June 12, 1917
GARDNER, HARRY CARTER. Chf. Engr., John H. Wickersham, 724 North Lime St., Lancaster, Pa	Jun. Assoc. M. M.	July 1, 1909 Nov. 12, 1913 June 12, 1917
GAUMER, ALBERT WESLEY. Supt., Juragua Iron Co., Box 383, Santiago de Cuba, Cuba	Assoc. M. M.	May 31, 1910 June 12, 1917
GENDELL, DAVID SMITH, JR. Mgr. of Erection, McClintic-Marshall Co., Pottstown, Pa		June 11, 1917
GENTNER, OTTO HENRY, JR. Cons. Engr., Northwest Cor., 16th and Sansom Sts., Philadelphia, Pa	Assoc. M. M.	Nov. 4, 1908 May 15, 1917
GEORGE, HOWARD HOWELL. Asst. Engr., M. of W., Public Service Ry., Room 646, Public Service Terminal Bldg., Newark, N. J	Assoc. M. M.	April 1, 1914 June 12, 1917
GINSBURG, SAMUEL ROWLAND. Gen. Supt., Central Romana, La Romana, Dominican Republic	Assoc. M. M.	May 28, 1912 May 15, 1917
GREEN, CHARLES NEWTON. Engr., Subsurface Structures, Public Service Comm., First Dist., 120 Broadway, New York City	Assoc. M. M.	June 3, 1903 June 12, 1917
GRONER, TRYGVE DANIEL BODTKER. Chf. Engr., D. T. & I. R. R., Springfield, Ohio	Assoc. M. M.	Mar. 4, 1914 June 12, 1917
GUTTIN, HENRY. Mech. Engr., Am. Cotton Oil Co., 27 Beaver St., New York City		May 15, 1917
HENDERSON, SAMUEL WHILDEN. Gen. Mgr., Marysville Light, Power & Water Co.; Vice-Pres. and Gen. Mgr., The Excelsior Springs Water, Gas & Elec. Co., Excelsior Springs, Mo	Assoc. M. M.	Sept. 6, 1905 June 12, 1917
HIGGINS, HERMAN KEENE. 209 McBride St., Jackson, Mich	Assoc. M. M.	Nov. 7, 1906 Jan. 16, 1917

MEMBERS (*Continued*)

		Date of Membership.
HOWARD, OLIVER ZELL. Care, The Diamond Match Co., Lawrence, Mass.	Assoc. M. M.	Feb. 28, 1911 May 15, 1917
HOWE, CLARENCE DECATUR. Cons. Engr., 2d Floor, Whalen Bldg., Port Arthur, Ont., Canada.	Jun. Assoc. M. M.	Oct. 5, 1909 May 7, 1913 June 12, 1917
HUBER, WALTER LEROY. Cons. Engr., 1304 First National Bank Bldg., San Francisco, Cal.	Jun. Assoc. M. M.	April 3, 1906 Mar. 1, 1910 June 12, 1917
HURLBUT, HINMAN BARRETT. Cons. Engr., 3318 Nineteenth St., N. W., Washington, D. C.	Assoc. M. M.	July 1, 1909 June 12, 1917
LUDLOW, JUSTIN WYMAN. Asst. Engr., Los Angeles Harbor Dept., City Hall, San Pedro, Cal.	Jun. Assoc. M. M.	April 5, 1904 Mar. 1, 1910 Jan. 16, 1917
LUND, ALFRED MAJENDIE. 2618 Gaines St., Little Rock, Ark.	Assoc. M. M.	April 30, 1912 April 18, 1917
LYNDON, LAMAR. Cons. Engr. (Lyndon & Taylor), 21 Park Row, New York City.		May 15, 1917
MACKALL, JOHN NATHANIEL. Office Engr., State Highway Dept., Harrisburg, Pa.	Jun. Assoc. M. M.	Aug. 31, 1909 June 30, 1911 May 15, 1917
PHILLIPS, WILLIAM HALE. 508 Peyton Bldg., Spokane, Wash.	Jun. Assoc. M. M.	Nov. 1, 1904 May 4, 1909 May 15, 1917
POPERT, WILLIAM HOPF. Contr. Engr., Am. Bridge Co. and U. S. Steel Products Co., Room 609, Rialto Bldg., San Francisco, Cal.	Assoc. M. M.	Nov. 4, 1908 April 18, 1917
RANNEY, WILLIS. Cons. Engr. (Bartlett & Ranney), Chandler Bldg., San Antonio, Tex.	Assoc. M. M.	July 9, 1912 June 12, 1917
SHAW, PERCY AUGUSTUS. 297 Grove St., Fall River, Mass.	Assoc. M. M.	May 7, 1913 June 12, 1917
SHEPPERD, THOMAS SHACKELFORD. Mgr., Ulen Contr. Co., Montevideo, Uruguay.	Assoc. M. M.	June 30, 1911 June 12, 1917
SPALDING, WALTER JAMES. Supt., Municipal Eng., Southern Dist. of Panama Canal, Ancon, Canal Zone, Panama.	Jun. Assoc. M. M.	Nov. 1, 1904 Feb. 6, 1912 June 12, 1917
STARR, REX CAMERON. Hydr. Engr., Pacific Light & Power Corporation, 603 Pacific Elec. Bldg., Los Angeles, Cal.	Assoc. M. M.	Jan. 2, 1912 May 15, 1917
TROST, ADOLPHUS GUSTAVUS. Structural Engr. (Trost & Trost), El Paso, Tex.	Assoc. M. M.	Sept. 3, 1913 June 12, 1917
TRUEHART, EDWARD GARLAND. Chf. Engr., Ulen Contr. Co., Montevideo, Uruguay.		Mar 13, 1917

MEMBERS (*Continued*)

		Date of Membership.
TULLOCK, HUBERT SOUTHWICK. Mgr., Highway Bridge Dept., Mo. Val. Bridge & Iron Co., Leavenworth, Kans.	Assoc. M. M.	June 4, 1913 June 12, 1917
WARNER, JACOB LATCH. Eng. Dept., E. I. du Pont de Nemours & Co., 1017 Shallcross Ave., Wilmington, Del.		May 15, 1917
WATKINS, GUY ANDERSON. Cons. Engr. (Dickinson & Watkins), 610 State Bank Bldg., Little Rock, Ark.	Jun. Assoc. M. M.	Jan. 3, 1907 Nov. 8, 1909 June 12, 1917
WHITCOMB, RALPH NIMS. Asst. to Vice-Pres., The J. G. White Eng. Corporation, 43 Exchange Pl., New York City.		May 15, 1917
WHITE, FRANK GEORGE. Chf. Engr., Board of State Harbor Commrs., Room 18, Ferry Bldg., San Francisco, Cal.	Jun. Assoc. M. M.	Dec. 3, 1901 Dec. 7, 1904 Mar. 13, 1917
WILLIAMS, MAURICE WILLIAM. Senior Asst. Engr., State Engr.'s Office, 158 State St., Albany, N. Y.	Assoc. M. M.	Jan. 31, 1911 June 12, 1917
WILLIAMS, WILLIAM HORACE. Civ. Engr. and Gen. Contr. (Doullut & Williams), 1016 Hibernia Bank Bldg., New Orleans, La.	Assoc. M. M.	Oct. 29, 1912 June 12, 1917

ASSOCIATE MEMBERS

ANDERSON, JOHN EDWARD. Lieut. and Adjutant, Royal Engrs., Headquarters, Royal Engrs., 33d Div., B. E. F., France	Jun. Assoc. M.	Aug. 31, 1915 April 17, 1917
ATWOOD, CHESTER ELY. Res. Engr., The Valier Montana Land & Water Co., Valier, Mont.	Jun. Assoc. M.	Feb. 1, 1910 May 15, 1917
AYERS, MURRAY CHASE. 1623 West 24th St., Los Angeles, Cal.		May 15, 1917
BAKER, FREDERICK ANDREW. Chf. Engr., Bogalusa Paper Co., Inc., 308 North Border Drive, Bogalusa, La.		June 11, 1917
BANISTER, WILBUR VICK. Care, Stone & Webster, Whitinsville, Mass.		June 11, 1917
BARBER, JUSTIN FREDERIC. 1515 Mozart St., Alameda, Cal.		April 17, 1917
BECK, RALPH ERNEST. Junior Engr., Grade 8, Public Service Comm., First Dist. (Res., 14 Prospect Park, S. W.), Brooklyn, N. Y.	Jun. Assoc. M.	Dec. 3, 1913 April 17, 1917
BENNISON, ERNEST WILLIAM. County Highway and Bridge Engr., Adams County, Corning, Iowa.		Mar. 13, 1917
BERENTS, HANS. Cons. Engr., 13 Nanking Rd., Shanghai, China.		Mar. 13, 1917

ASSOCIATE MEMBERS (*Continued*)

		Date of Membership.
BICKERTON, WILBUR EARL. Designer and Estimator, Baltimore Office, Trussed Concrete Steel Co., 1123 Munsey Bldg., Baltimore, Md.	Jun.	Jan. 6, 1915
	Assoc. M.	May 15, 1917
BISHOP, GUY HERSEY. City Engr., Oelwein, Iowa	Jun.	Dec. 2, 1914
	Assoc. M.	May 15, 1917
BOGERT, JOHN RALPH. 207 Colonial Bldg., Wilkinsburg, Pa.		May 15, 1917
BOLTON, FRANK LEONARD. Res. Engr., Mill Creek Flood Control Project, 508 Palace Hardware Bldg., Erie, Pa.	Jun.	June 30, 1910
	Assoc. M.	May 15, 1917
BOWEN, ROBERT LAWTON. Asst. Engr., State Harbor Impvt. Comm., 26 Sycamore St., Providence, R. I.		June 11, 1917
BOWERS, ALBERT GEORGE. Gwynear, Chefoo, China		Nov. 28, 1916
BOYD, ROBERT PLATT. Res. Engr., Parish of Ouachita, Box 375, Monroe, La.		June 11, 1917
BRIGGS, ROBERT WESLEY. Asst. Engr., N. Y. C. R. R., 20 Rollins St., Yonkers, N. Y.		June 11, 1917
BROWN, JOHN HENRY, JR. Secy., Manwaring & Cummins, Inc., 24 East Church Lane, Philadelphia, Pa.		June 11, 1917
BUFORD, CHARLES HOMER. 1306 Jackson St., Sioux City, Iowa		June 11, 1917
CAMPBELL, PAUL CALDWELL. Casilla de Correo No. 403, Montevideo, Uruguay	Jun.	May 6, 1914
	Assoc. M.	April 17, 1917
CANFIELD, GEORGE HATHAWAY. Civ. Engr., Pacific Gas & Elec. Co., 1519 Alice St., Oakland, Cal.		May 15, 1917
CARTER, HUGH RUBEN. State Highway Engr. of Arkansas, 1869 Gaines St., Little Rock, Ark.		Mar. 13, 1917
CATON, JOHN HIRST, 3D. 70 Arnold Ave., Providence, R. I.		June 11, 1917
CHAMBERLIN, EARL WILLIAM. Engr., Fireproofing Dept., U. S. Gypsum Co., 5865 Glenwood Ave., Chicago, Ill.		May 15, 1917
CHAPIN, CHARLES WALTER. Constr. Engr., California Highway Comm., 320 Higuera St., San Luis Obispo, Cal.		June 11, 1917
CHRISTHILF, FRANCIS DORSEY. Gen. Contr. (Carozza & Christhilf), 18 York Court, Guilford, Baltimore, Md.		June 11, 1917
CLAYSON, GEORGE PHELPS. Mgr., Steel Dept., Chicago Office, Trussed Concrete Steel Co., 7455 Greenview Ave., Chicago, Ill.		June 11, 1917
CLINTON, DELMAR SMITH. Army and Navy Club, Manila, Philippine Islands		Jan. 15, 1917
CONVERSE, JOSEPH BRANDLY. Asst. State Highway Engr., State Highway Dept., Montgomery, Ala.		May 15, 1917
COURTENAY, WILLIAM HENRY. Engr., Estimator, and Designer for C. P. Bower, 1324 North 58th St., Philadelphia, Pa.		June 11, 1917

ASSOCIATE MEMBERS (*Continued*)

		Date of Membership.
CRESSON, JAMES. County Engr., Montgomery County, Airy and Church Sts., Norristown, Pa.		June 11, 1917
DE MEY, EDOUARD JEAN BERNARD. Constr. Engr., Toupet, Beil & Conley, Inc., 730 H. W. Oliver Bldg., Pittsburgh, Pa.	Jun. Assoc. M.	Jan. 2, 1912 May 15, 1917
DODGE, WALDO EDGAR. 36 Eucalyptus Rd., Berkeley, Cal.		Mar. 13, 1917
DRAPER, LOTT DAVIS. Structural Engr., Am. Bridge Co., 28 East Tulpehocken St., Germantown, Philadelphia, Pa.		May 15, 1917
DUNLAP, ARTHUR HOYT. Chf. Engr., Ward County Irrig. Dist. No. 1, Barstow, Tex.		May 15, 1917
DUNLAP, JOHN HOFFMAN. Asst. Prof. of Hydraulics and San. Eng., The State Univ. of Iowa, 104-N, Hall of Eng., Iowa City, Iowa.		April 17, 1917
DUPUY, VICTOR NEWTON. Asst. Engr., Alaska Juneau Gold Min. Co., Box 186, Juneau, Alaska.		Jan. 15, 1917
EASTON, RUSSELL BURNS. Cons. Engr. (Easton & Wells), Aberdeen, S. Dak.	Jun. Assoc. M.	Mar. 3, 1908 Nov. 28, 1916
EDGREN, ARTHUR H. County Engr., Lancaster County, 2045 Pepper Ave., Lincoln, Nebr.		Jan. 15, 1917
EDWARDS, RAMON SALAS. Prof., Civ. Eng., Universidad Catolica de Santiago, Compania 1618, Santiago, Chile.		April 17, 1917
ELLIS, LESTER FISHER. 52 Waltham St., Lexington, Mass.		May 15, 1917
ENGLISH, HAROLD LEWIS. Junior Structural Engr., Div. of Valuation, Interstate Commerce Comm., Washington, D. C.	Jun. Assoc. M.	Mar. 5, 1912 May 15, 1917
ERICSON, LAMBERT THEODORE. Contr. Engr., The Jennison-Wright Co., 2463 Broadway, Toledo, Ohio.		May 15, 1917
EURICH, RICHARD HENDERSON. 144 Union St., Montclair, N. J.	Jun. Assoc. M.	Mar. 4, 1913 June 11, 1917
EVERETT, CHESTER MCKENZIE. (Hazen, Whipple & Fuller), 30 East 42d St., New York City.		May 15, 1917
EVERS, RUDOLPH. 1138 Hancock St., Brooklyn, N. Y.		May 15, 1917
FAISON, HAYWOOD RENICK. Box 651, Wilmington, N. C.		Jan. 15, 1917
FELLOWS, PERRY AUGUSTUS. Instr. in Civ. Eng., Univ. of Michigan, 636 South 12th St., Ann Arbor, Mich.		June 11, 1917
FOX, ALVIN BARTHOLDI. (Larson & Fox), 137 Smith St., Perth Amboy, N. J.		May 15, 1917
GALE, CLARENCE STEPHENS. Res. Engr., Maryland State Roads Comm., Easton, Md.		June 11, 1917
GARNETT, BENJAMIN JAY. Office Engr., City Engr.'s Office, Spokane, Wash.	Jun. Assoc. M.	Nov. 1, 1910 Jan. 15, 1917
GIBBS, WILLIAM WETMORE. Asst. Gen. Mgr., The Phosphate Min. Co., Nichols, Fla.	Jun. Assoc. M.	Oct. 7, 1914 May 15, 1917
GIBSON, OTIS. 2407 Lincoln Way, San Francisco, Cal.		April 17, 1917

ASSOCIATE MEMBERS (*Continued*)

	Date of Membership.
GIESEN, WALTER EDWARD. Estimator, Fred A. Jones Constr. Co., 420 Interurban Bldg., Dallas, Tex	Nov. 28, 1916
GOEDEL, FRANK PEAT. Asst. Prof. of Physics and Electrical Eng., State Agricultural Coll., 708 South College Ave., Fort Collins, Colo	April 17, 1917
GOODWIN, WILLIAM ROBERT. Asst. Engr., City Engr.'s Dept., 2710 Pleasant Ave., Minneapolis, Minn	May 15, 1917
GRAY, HOWARD ALLISON. Squad Chf., Stone & Webster Eng. Corporation, 71 Wallace St., West Somerville, Mass	May 15, 1917
GRUETZMACHER, CLARENCE SAYLOR. 767 Marshall St., Milwaukee, Wis	May 15, 1917
GRUNAUER, MORTIMER. Field Supt., Bing & Bing Constr. Co., 119 West 40th St. (Res., 216 West 141st St.), New York City	Jun. Feb. 6, 1912 Assoc. M. Mar. 13, 1917
HALL, BENJAMIN MORTIMER, JR. Civ. and Min. Engr. (B. M. Hall & Son), 501 Peters Bldg., Atlanta, Ga	May 15, 1917
HANSON, NEAL. Associate and Superv. Engr., Bartlett & Ranney, Inc., Eagle's Nest Dam, Ute Park, N. Mex	June 11, 1917
HARTER, ALOYSIUS FRANK. Asst. City Engr., 726 East Culver St., Phœnix, Ariz	May 15, 1917
HARTFORD, FRED DAILEY. Chf. Draftsman, Western Chemical Mfg. Co., 608 Pearl St., Denver Colo	Jun. April 7, 1915 Assoc. M. June 11, 1917
HERKNESS, LINDSAY COATES. Capt., Corps. of Engrs., U. S. A., Room 707, Army Bldg., New York City	Mar. 13, 1917
HEWS, WELLINGTON PRESCOTT. Asst. Field Engr., Interstate Commerce Comm., 731 Wells Fargo Bldg., San Francisco, Cal	June 11, 1917
HOFFMAN, EUGENE ROBERT. Chf. Draftsman, Washington State Highway Dept., Box 535, Olympia, Wash	May 15, 1917
HUBER, JOSEPH EARL. Div. Engr., State Highway Dept., Wise Bldg., Mt. Vernon, Ill	May 15, 1917
HULSIZER, WILLIAM HILL. Asst. Engr., Valuation Dept., U. P. R. R., Room 207, Union Pacific Headquarters, Omaha, Nebr	May 15, 1917
HUMPHREYS, EWING SLOAN. Engr., John T. Wilson Co., Mutual Bldg., Richmond, Va.	Jun. Jan. 17, 1916 Assoc. M. May 17, 1917
JOHNSON, HALBERT THEODORE. 407 Federal Bldg., Salt Lake City, Utah	April 17, 1917
JOHNSON, HOLLISTER. Junior Engr., New York State Conservation Comm., Albany, N. Y	May 15, 1917
JONES, PERCIVAL CHARLES. Res. Engr., Westinghouse, Church, Kerr & Co., 1309 Cedar Ave., Scranton, Pa.	May 15, 1917

ASSOCIATE MEMBERS (*Continued*)

		Date of Membership.
JONES, ROBERT LEROY. 304 California Fruit Bldg., Sacramento, Cal.		May 15, 1917
KAHLER, CHARLES PORTERFIELD. 606 Deseret News Bldg., Salt Lake City, Utah.		Mar. 13, 1917
KAUFMANN, ERNST GUSTAV. Engr., Eastern Concrete Steel Co., 402 D. S. Morgan Bldg., Buffalo, N. Y.	Jun. Assoc. M.	Oct. 1, 1913 May 15, 1917
KIRSTEIN, PAUL ROBERT. Asst. Engr., City Engr.'s Office 2546 Auburn Ave., Cincinnati, Ohio.		May 15, 1917
KNIGHT, ARTHUR JULIUS. Asst. Prof., Civ. Eng., and Supt., Bldg. and Grounds, Worcester Polytechnic Inst., Worcester, Mass.		June 11, 1917
KNOLLMAN, ENNO PAUL. (Braun, Fleming & Knollman), 30 East Lane Ave., Columbus, Ohio.		May 15, 1917
KREAMER, ADONIS WILLIAM. U. S. Junior Engr., P. O. Box 75, Wheeling, W. Va.		May 15, 1917
LAMB, LYMAN CALVIN. 54 Quinn Ave., Youngstown, Ohio.		June 11, 1917
LAMBERT, EDWARD ALLYN. Chf. Engr., New England Branch, The Austin Co., Newfield Bldg., Bridgeport, Conn.		May 15, 1917
LA ROCHE, ARTHUR LEWIS. Deputy City Engr., City Engr.'s Office, Binghamton, N. Y.		May 15, 1917
LARSON, MORGAN FOSTER. (Larson & Fox), 137 Smith St., Perth Amboy, N. J.		May 15, 1917
MACNAUGHTON, PERCIVAL JOHN. Res. Engr., Fred T. Ley & Co., Inc., 19 Warner St., Springfield, Mass.		May 15, 1917
MCCLUSKEY, WILLIAM OLIVER, JR. County Engr., Ohio County, County Bldg., Wheeling, W. Va.		May 15, 1917
MAILEY, JOHN BRUCE. 20 Howard St., East Lynn, Mass.	Jun. Assoc. M.	April 30, 1912 May 15, 1917
MANDELZWEIG, HYMAN HARRY. Asst. Engr., Cuyahoga County, 1480 East 115th St., Cleveland, Ohio.		May 15, 1917
MANZANILLA Y CARBONELL, JOSÉ JUSTO. Asst. Engr., Smith, Ames & Chisholm, Lonja 510, Havana, Cuba.	Jun. Assoc. M.	June 30, 1910 June 11, 1917
MELTZER, JOSEPH. 316 Dickinson St., Springfield, Mass.		April 17, 1917
MERRIAM, CHARLES ALLEN. Structural Engr. and Supt. of Constr., A. E. Doyle, 401 Worcester Bldg., Portland, Ore.		June 11, 1917
MILLS, GUY G. Acting Dist. Mgr., Portland Cement Assoc., 1123 Hurt Bldg., Atlanta, Ga.	Jun. Assoc. M.	June 24, 1914 April 17, 1917
MOLLER, IRVING CLARK. Care, The Barrett Co., 17 Battery Pl., New York City.		Mar 13, 1917

ASSOCIATE MEMBERS (*Continued*)

		Date of Membership.
MURRAY, CLIFFORD EATON. Archt. and Engr., 26 Clinton St., Newark, N. J.	Jun.	May 6, 1914
	Assoc. M.	May 15, 1917
NELSON, ERNEST BENJAMIN. Asst. Engr., Andes Cooper Min. Co., Casilla 230, Antofogasta, Chile.	Jun.	Oct. 31, 1911
	Assoc. M.	May 15, 1917
NICHOLSON, GEORGE FRANCES. Acting Chf. Engr., Port of Seattle, 603 Thirty-third, North, Seattle, Wash.		May 15, 1917
OLDS, ALBERT ROY. Engr., M. of W., Havana Elec. Ry., Light & Power Co., P. O. Box 570, Havana, Cuba.		May 15, 1917
O'ROURKE, FRANK HUGH. Asst. Gen. Mgr., McNerney Constr. Co.; Engr. and Contr. (McNerney & O'Rourke), Sellersville, Pa.		May 15, 1917
PARKER, KINGSBURY EASTMAN. Treas. and Mgr., Clinton Constr. Co., 140 Townsend St., San Francisco, Cal.	Jun.	May 5, 1908
	Assoc. M.	May 15, 1917
PAXTON, THOMAS PRESTON. Commr. of Public Works, Box 937, Okmulgee, Okla.		June 11, 1917
PENN, WILLIAM CLAY. Supt., Knoxville Power Co., Alcoa, Tenn.		June 11, 1917
PERSONS, VICTOR SMITH. Sales Engr., L. A. Norris Co., 140 Townsend St., San Francisco, Cal.		June 11, 1917
PETERS, WILLIAM FREDERICK. (The Peters Carpenter Handy Co.), 206 Second National Bldg., Akron, Ohio.		April 17, 1917
PHALAN, JOHN JOSEPH FRANCIS. Engr. in Chg. of Constr. of Road 5585, State Comm. of Highways, Utica, N. Y.	Jun.	April 30, 1912
	Assoc. M.	May 15, 1917
PYLE, CLYDE BEETHOVEN. Asst. to Mgr., McClintic-Marshall Co., Pittsburgh, Pa.		April 17, 1917
QUINN, MAURICE JAMES. 205 Lincoln Bldg., Detroit, Mich.		May 15, 1917
RAKESTRAW, CHARLES LYSANDER. Junior Engr., U. S. Engr. Office, 405 Custom House, San Francisco, Cal.	Jun.	June 4, 1913
	Assoc. M.	May 15, 1917
RAMSER, CHARLES ERNEST. P. O. Box 294, Jackson, Tenn.	Jun.	Mar. 1, 1910
	Assoc. M.	June 11, 1917
RAY, ROBERT BRIGHT. 3017 Brighton Ave., Los Angeles, Cal.		April 17, 1917
REANEY, CHARLES FRANKLIN. Asst. Engr., Waterloo, Cedar Falls & No. Ry., 322 Denver St., Waterloo, Iowa.	Jun.	Aug. 31, 1915
	Assoc. M.	Jan. 15, 1917
REED, PERCY LAWRENCE. Senior Instr., Civ. Eng., Drexel Inst., 268 South 38th St., West Philadelphia, Pa.		June 11, 1917
RIDDLE, WILLIAM CATHCART. Asst. Engr., Pennsylvania State Dept. of Health. Harrisburg, Pa.		June 11, 1917
RINEHART, CHARLES RAMSAY. 50 Church St., Room 2079, New York City.		May 15, 1917

ASSOCIATE MEMBERS (*Continued*)

	Date of Membership.
ROSCHE, WILBERT ROBIN. Office Engr., H. Koppers Co., 1109 College Ave., Pueblo, Colo.	May 15, 1917
ROSS, ANDREW FRANCIS. 4167 Julian St., Denver, Colo.	June 11, 1917
SAXE, VAN RENSSELAER POWELL. Pres., Standard Concrete Steel Co., Knickerbocker Bldg., Baltimore, Md. — Jun.	Feb. 4, 1908
— Assoc. M.	Nov. 28, 1916
SCHARPENBERG, CHARLES CHRISTIAN. Efficiency Engr., Producing Dept., Standard Oil Co., 2110 Nineteenth St., Bakersfield, Cal.	May 15, 1917
SCOTT, LEWIS PELOT. Asst. Engr., Illinois Highway Dept., 138 Fox St., Aurora, Ill.	June 11, 1917
SECREST, THOMAS WILLIAM. Locating Engr., Alaskan Eng. Comm., Anchorage, Alaska.	April 17, 1917
SHERMAN, JAMES HILTON. Vice-Pres. and Chf. Engr., Reyburn-Sherman Eng. & Constr. Co., 3600 Paseo, Kansas City, Mo.	May 15, 1917
SIGLER, ELMER. Vice-Pres. and Engr., J. P. Sprague Co., 1308 Rialto Bldg., Kansas City, Mo.	May 15, 1917
SILAGI, EUGENE ADALBERT. Mgr., Columbus Branch, Trussed Concrete Steel Co., 1000 Columbus Savings & Trust Bldg., Columbus, Ohio.	June 11, 1917
SMITH, ELROY GEORGE. 400 Harrison Bldg., Augusta, Ga. — Jun.	Sept. 1, 1908
— Assoc. M.	April 17, 1917
SMITH, ROY ELMER. Draftsman, Copper River & Northwestern Ry., Cordova, Alaska. — Jun.	June 30, 1911
— Assoc. M.	April 17, 1917
SPEAR, ROY ELBERT. Engr., Sewer Design, Engr. Dept., 1316 Beach St., Flint, Mich.	Mar. 13, 1917
STEELE, ISAAC CLEVELAND. Civ. Engr., Pacific Gas & Elec. Co., 445 Sutter St., San Francisco, Cal.	May 15, 1917
TABER, ROCK GRANITE. Supt. of Constr., Stone & Webster, 3005 Holmes St., Dallas, Tex.	June 11, 1917
THORNTON, LOUIS EARLE. Care, 1st Company, E. O. R. T. C., American Univ. Grounds, Washington, D. C.	June 11, 1917
TRETTEN, OTTO CHRISTIAN. Care, California Highway Comm., Gaviota, Cal.	May 15, 1917
TYSON, WILLIAM CLAUDE. Junior Engr., U. S. Engr. Office, Kansas City, Mo.	May 15, 1917
VAN AUKEN, CLAUDE LINN. Asst. Engr., N. Y. C. R. R., 5256 Fulton St., Chicago, Ill.	May 15, 1917
VAN VLIET, GEORGE PARKER. Chf. Engr., The Robinson Clay Product Co., 1010 East Market St., Akron, Ohio.	May 15, 1917
WALKER, LESTER CARL. Asst. Chf. Engr., Idaho Irrig. Co., Ltd., Richfield, Idaho.	May 15, 1917

ASSOCIATE MEMBERS (*Continued*)

		Date of Membership.
WALLER, JOHN MALCOLM. Junior Structural Engr., Interstate Commerce Comm., Western Dist., Div. of Valuation, Interstate Bldg., Kansas City, Mo.	Jun. Assoc. M.	Dec. 2, 1914 June 11, 1917
WARD, GEORGE SPARKMAN. Bowman, S. C.	Jun. Assoc. M.	April 1, 1914 Jan. 15, 1917
WARD, HERBERT KIRKMAN. Care, S. L. Ward, 2931 Dale St., San Diego, Cal.		May 15, 1917
WARD, JASPER DUDLEY. Co. C, 55th Infantry, Military Branch, Chattanooga, Tenn.		Mar. 13, 1917
WARREN, MINTON MACHADO. Secy., Hydr. Div., Stone & Webster Eng. Corporation, 147 Milk St., Boston, Mass.	Jun. Assoc. M.	Nov. 4, 1914 May 15, 1917
WEBSTER, MAURICE ANDERSON. With William Steele & Sons Co., 238 Winona Ave., Germantown, Philadelphia, Pa.	Jun. Assoc. M.	Sept. 2, 1914 May 15, 1917
WELLS, FRANK HARRIS. Structural Designer of Bldgs., Larrowe Constr. Co., 1199 Woodward Ave., Detroit, Mich.		April 17, 1917
WELLS, HARRY ARTEMAS. Supt., Bldgs. and Grounds, Dartmouth Coll.; Cons. Engr. and Archt., Parkhurst Administration Bldg., Hanover, N. H.		May 15, 1917
WRIGHT, CLAUDE RICHARD. Engr. Insp., U. S. Engr. Office, 802 Couch Bldg., Portland, Ore.		April 17, 1917
YOLTON, ROBERT ELGENE. Chf. Engr., Kilby Frog & Switch Co., 2906 North 13th Ave., Birmingham, Ala.		April 17, 1917
YOUMANS, GEORGE LELAND. Supt., Puyallup Dredging Co., Box 1610, Tacoma, Wash.	Jun. Assoc. M.	Jan. 7, 1913 June 11, 1917

JUNIORS

ANDERSON, ROY LEONARD. Engr. and Salesman, California Corrugated Culvert Co., West Berkeley, Cal.	Jan. 11, 1917
ARNOLD, LEON JOHN. 1018 East 163d St., New York City.	Jan. 15, 1917
AUSTIN, HERBERT ASHFORD ROBERTSON. Junior Engr., U. S. Geological Survey, Water Resources Branch, 20 Kapiolani Bldg., Honolulu, Hawaii.	April 17, 1917
BINGER, WALTER DAVID. Hotel Essex, Madison Ave. and 56th St., New York City.	May 15, 1917
BRAGONIER, ARTHUR TAYLOR. 420 Campbell Ave., S. W., Roanoke, Va.	May 15, 1917
BRICKLIN, SIMON. Draftsman, Bureau of Yards and Docks, Navy Dept., Navy Yard (Res., 62 Coming St.), Charleston, S. C.	May 15, 1917
BURGER, ALFRED ANDREW. Doylestown, Ohio.	June 11, 1917

JUNIORS (*Continued*)

	Date of Membership.
CARNELLI, CHARLES MICHAEL. Meter Tester, Westinghouse Elec. & Mfg. Co. of Newark, N. J., 160 East 115th St., New York City	June 11, 1917
GENUNG, JAMES HOLCOMBE, JR. 3d Co., Engrs., O. T. S., Fort Leavenworth, Kans	Jan. 15, 1917
GRAFF, GEORGE WASHINGTON. Res. Chemist and Bacteriologist, Kingston Municipal Water Supply, Box 91, R. R. 2, Kingston, N. Y	Jan. 15, 1917
GREHAN, BERNARD HENRY. 3431 Prytania St., New Orleans, La	May 15, 1917
HICKOK, CHARLIE WILLIAM. Rodman, Interstate Commerce Comm., Div. of Valuation, Interstate Bldg., Kansas City, Mo	Mar. 13, 1917
HUSSON, WILLIAM MORAGNE. 2d Lieut., 17th Cavalry, Douglas, Ariz	June 23, 1916
KNOST, WILLIAM ARNOLD. Care, United Fruit Co., Bocas del Toro, Panama	April 17, 1917
LANDRETH, JAMES TAYLOR. Asst. Engr., Bronx Parkway Comm., Scarsdale, N. Y	Nov. 28, 1916
MERCKEL, FREDERICK GEORGE. Engr., Trustees, Estate of William Beard, 502 West 139th St., New York City	April 17, 1917
MORGAN, THOMAS CHARLES. 1173 Bushwick Ave., Brooklyn, N. Y	May 15, 1917
NABOW, DAVID. Care, Southern Power Co., Charlotte, N. C	May 15, 1917
NICHOLS, ARTHUR CLOUGH. Junior Engr., Southern Ry. System, Lines East, 701 West Church St., Knoxville, Tenn	June 11, 1917
PEREIRA, ARMANDO DE ARRUDA. Engr., Companhia Constructora de Santos, Avenida Cons. Nebias 559, Santos, Brazil	Jan. 15, 1917
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BROWN, HORATIO WHITTEMORE. Elm St., Concord, Mass.

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DALEE, WILLIAM AMON. Care, Canadian Des Moines Steel Co., Ltd., Chatham, Ont., Canada.

DE CHARMS, RICHARD, JR. 3d Co., Engr. Officers' Training Camp, American Univ., Washington, D. C.

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DOUGHERTY, EDWARD JAMES. Supt., Empire Eng. Co., Inc., Fallsington, Pa.

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DRURY, WALTER RHODES. 426 Maynard St., Ann Arbor, Mich.

JUNIORS (*Continued*)

ESTES, LEWIS ALDEN. Dist. Representative, Trussed Concrete Steel Co., 146 Summer St., Boston, Mass.

FINDLAY, ELWIN HAROLD. 175 West 73d St., New York City.

FISCHER, CHARLES, JR. 7th Co., 2d N. Y. Regiment, Plattsburg, N. Y.

GAY, GEORGE INNESS. Care, The Comm. for Relief in Belgium, 3 London Wall Bldgs., London, E. C., 2, England.

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HARRINGTON, WELLESLEY CARL. Weedsport, N. Y.

HAYS, JAMES BUCHANAN. Designing Draftsman with F. C. Horn, Meridian, Idaho.

HESLOP, PAUL LOVERIDGE. Fargo Eng. Co., Jackson, Mich.

HEWETT, MAURICE WILLIAM. First Engr. Company, 13th Provisional Regiment, Fort Leavenworth, Kans.

HOWARD, CECIL WARD. 210 Allendale Ave., Detroit, Mich.

KINNEAR, LAWRENCE WILSON. 137 Riverside Drive, New York City.

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MILHAN, DAVID NELSON. Div. Engr., Portland Cement Assoc., Sodus, N. Y.

MILKOWSKI, VICTOR JOHN. 2d Lieut., Engr. Officers' Reserve Corps, Engr. Co. No. 1, Madison Barracks, N. Y.

MUNSON, CHARLES HAROLD. Care, W. H. Munson, 317 Franklin St., Winona, Minn.

NAGLER, FLOYD AUGUST. 387 Hamilton St., Albany, N. Y.

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OSTROM, CHARLES DOUGLAS YELVERTON. 2d Lieut., Coast Artillery Corps, U. S. A., Fort Barrancas, Fla.

PARSONS, MAURICE GIESY. Purchasing Agt., Peninsula Shipbuilding Co., Portland, Ore.

PEARCE, RUFUS BURLESON. Richland, Tex.

RICÉ, ROGER CUSHING. Care, U. S. Geological Survey, 25 Federal Bldg., Topeka, Kans.

RICHARDS, GEORGE WILLIAM. 531 Pennsylvania Ave., Oakmont, Pa.

JUNIORS (*Continued*)

SCHROEDER, SEATON, JR. Lieut., U. S. N. R. F., Public Works Dept., Navy Yard, Brooklyn, N. Y.

SEARIGHT, GEORGE PETER. With The Foundation Co., Ltd., 127 Drummond St., Montreal, Que., Canada (Res., Carlisle, Pa.).

SMITH, RICHARD BENNETT. 1451 Stout St., Denver, Colo.

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STEINBRUCH, WALTER. Care, Snare & Triest Co., Chattanooga, Tenn.

STEPHENS, UEL. Box 133, Lometa, Tex.

SUMMERS, RICHARD ELVIN JEWELL. Civ., Hydr. and San. Engr., 508 McNair Ave., Wilkinsburg, Pa.

SWARTZ, LEON. Master Engr., Engr. Reserve, Broad Ford, Pa.

TAYLOR, SENECA VERN. Dist. Sales Mgr., The General Fireproofing Co., 73 State St., Room 205, Detroit, Mich.

TILTON, GEORGE ALBERT, JR. Care, P. L. & P. Co., Big Creek, Fresno, Cal.

TOMS, JAY WILLIAM. State Sanatorium, Md.

VAN NESS, RUSSELL ALGER. McLean, Ill.

VELTFORT, THEODORE ERNST. Care, H. E. Allen, 131 King St., Dorchester, Mass.

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WONG, JICK GAM. Hankow-Ichang Ry., Res. Engr.'s Office, Section 10, Yang-Kia-Hung, Hupeh Province, China.

WOOLWORTH, WENDELL HOWARD. 2d Lieut., U. S. A., Commanding Co. K, 28th Infantry, Mission, Tex.

YEO, WILLIAM ALBERT. Civ. Engr., Nicaragua Development Corporation, Pearl Lagoon, Nicaragua.

YEREANCE, ALEXANDER WOODWARD. 418 Centre St., South Orange, N. J.

REINSTATEMENTS

	Date of Reinstatement.
MEMBERS	
ROSS, ALEXANDER BELL	June 11, 1917
ASSOCIATE MEMBERS	
GOODSELL, DANIEL BERTHOLF	June 11, 1917
TURLEY, OMNER JAY	June 11, 1917
JUNIORS	
HORRIGAN, WILLIAM JAMES	June 11, 1917

RESIGNATIONS

ASSOCIATE MEMBERS	Date of Resignation.
MOOREFIELD, CHARLES HENRY	June 11, 1917
JUNIORS	
SOUTHER, MORTON EDWIN	June 11, 1917

DEATHS

EVEREST, CHARLES MARVIN. Elected Fellow, November 1st, 1892; died July 22d, 1917.

FIRMSTONE, FRANK. Elected Member, August 7th, 1878; died June 27th, 1917.

FRAZEE, JOHN HATFIELD. Elected Associate Member, December 6th, 1899; died May 4th, 1917.

GRIMSHAW, JAMES WALTER. Elected Member, November 7th, 1888; died February 15th, 1917.

HOWARD, JOEL MANNING. Elected Associate Member, June 4th, 1913; died May 22d, 1917.

JENKINS, JAMES EDGAR. Elected Associate Member, December 5th, 1906; Member, March 14th, 1916; died July 5th, 1917.

LOCKE, FRANKLIN BUCHANAN. Elected Member, March 1st, 1893; died May 11th, 1917.

MILLER, STANLEY ALFRED. Elected Junior, February 4th, 1902; Associate Member, April 6th, 1909; Member, June 24th, 1916; died May 13th, 1917.

POMEROY, LEWIS ROBERTS. Elected Associate, April 2d, 1890; died May 7th, 1917.

SIMSON, DAVID. Elected Member, January 8th, 1902; died December 16th, 1916.

SPENCE, DAVID WENDEL. Elected Member, October 1st, 1913; died June 29th, 1917.

Total Membership of the Society, August 2d, 1917, 8 401.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(May 1st to June 30th, 1917)

NOTE.—*This list is published for the purpose of placing before the members of this Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS

In the subjoined list of articles, references are given by the number prefixed to each journal in this list:

(2) *Proceedings*, Engrs. Club of Phila., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Chicago, Ill., 50c.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(7) *Gesundheits Ingenieur*, München, Germany.
(8) *Stevens Indicator*, Hoboken, N. J., 50c.
(9) *Industrial Management*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, 432 Fourth Ave., New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News-Record*, New York City, 15c.
(15) *Railway Age Gazette*, New York City, 15c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Electric Railway Journal*, New York City, 10c.
(18) *Railway Review*, Chicago, Ill., 15c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 20c.
(21) *Railway Engineer*, London, England, 1s. 2d.
(22) *Iron and Coal Trades Review*, London, England, 6d.
(23) *Railway Gazette*, London, England, 6d.
(24) *American Gas Engineering Journal*, New York City, 10c.
(25) *Railway Mechanical Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England, 4d.
(27) *Electrical World*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, Mass., $1.
(29) *Journal*, Royal Society of Arts, London, England, 6d.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium, 4 fr.
(31) *Annales* de l'Assoc. des Ing. Sortis des Ecoles Spéciales de Gand, Brussels, Belgium, 4 fr.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France, 1 fr.
(34) *Portefeuille Economiques des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *Cornell Civil Engineer*, Ithaca, N. Y.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Technisches Gemeindeblatt*, Berlin, Germany, 0, 70m.
(40) *Zentralblatt der Bauverwaltung*, Berlin, Germany, 60 pfg.
(41) *Electrotechnische Zeitschrift*, Berlin, Germany.
(42) *Proceedings*, Am. Inst. Elec. Engrs., New York City, $1.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governors Island, New York Harbor, 50c.
(45) *Coal Age*, New York City, 10c.
(46) *Scientific American*, New York City, 15c.
(47) *Mechanical Engineer*, Manchester, England, 3d.
(48) *Zeitschrift*, Verein Deutscher Ingenieure, Berlin, Germany, 1, 60m.
(49) *Zeitschrift für Bauwesen*, Berlin, Germany.
(50) *Stahl und Eisen*, Düsseldorf, Germany.
(51) *Deutsche Bauzeitung*, Berlin, Germany.
(52) *Rigasche Industrie-Zeitung*, Riga, Russia, 25 kop.
(53) *Zeitschrift*, Oesterreichischer Ingenieur und Architekten Vereines, Vienna, Austria, 70h.
(54) *Transactions*, Am. Soc. C. E., New York City, $12.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $6.
(57) *Colliery Guardian*, London, England, 5d.
(58) *Proceedings*, Engrs.' Soc. W. Pa., 568 Union Arcade Bldg., Pittsburgh, Pa., 50c.

(59) *Proceedings*, American Water-Works Assoc., Troy, N. Y.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Drop Forger*, Thaw Bldg., Pittsburgh, Pa., 10c.
(63) *Minutes of Proceedings*, Inst. C. E., London, England.
(64) *Power*, New York City, 5c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Gas Journal*, London, England, 6d.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(69) *Der Eisenbau*, Leipzig, Germany.
(71) *Journal*, Iron and Steel Inst., London, England.
(71a) *Carnegie Scholarship Memoirs*, Iron and Steel Inst., London, England.
(72) *American Machinist*, New York City, 15c.
(73) *Electrician*, London, England, 18c.
(74) *Transactions*, Inst. of Min. and Metal., London, England.
(75) *Proceedings*, Inst. of Mech. Engrs., London, England.
(76) *Brick*, Chicago, Ill., 20c.
(77) *Journal*, Inst. Elec. Engrs., London, England, 5s.
(78) *Beton und Eisen*, Vienna, Austria, 1, 50m.
(79) *Forscherarbeiten*, Vienna, Austria.
(80) *Tonindustrie Zeitung*, Berlin, Germany.
(81) *Zeitschrift für Architektur und Ingenieurwesen*, Wiesbaden, Germany.
(83) *Gas Age*, New York City, 15c.
(84) *Le Ciment*, Paris, France.
(85) *Proceedings*, Am. Ry. Eng. Assoc., Chicago, Ill.
(86) *Engineering-Contracting*, Chicago, Ill., 10c.
(87) *Railway Engineering and Maintenance of Way*, Chicago, Ill., 10c.
(88) *Bulletin* of the International Ry. Congress Assoc., Brussels, Belgium.
(89) *Proceedings*, Am. Soc. for Testing Materials, Philadelphia, Pa., $5.
(90) *Transactions*, Inst. of Naval Archts., London, England.
(91) *Transactions*, Soc. Naval Archts. and Marine Engrs., New York City.
(92) *Bulletin*, Soc. d'Encouragement pour l'Industrie Nationale, Paris, France.
(93) *Revue de Métallurgie*, Paris, France, 4 fr. 50.
(95) *International Marine Engineering*, New York City, 20c.
(96) *Canadian Engineer*, Toronto, Ont., Canada, 10c.
(98) *Journal*, Engrs. Soc. Pa., Harrisburg, Pa., 30c.
(99) *Proceedings*, Am. Soc. of Municipal Improvements, New York City, $2.
(100) *Professional Memoirs*, Corps of Engrs., U. S. A., Washington D. C., 50c.
(101) *Metal Worker*, New York City, 10c.
(102) *Organ für die Fortschritte des Eisenbahnwesens*, Wiesbaden, Germany.
(103) *Mining and Scientific Press*, San Francisco, Cal., 10c.
(104) *The Surveyor and Municipal and County Engineer*, London, England, 6d.
(105) *Metallurgical and Chemical Engineering*, New York City, 25c.
(106) *Transactions*, Inst. of Min. Engrs., London, England, 6s.
(107) *Schweizerische Bauzeitung*, Zürich, Switzerland.
(108) *Southern Machinery*, Atlanta, Ga. 10c.
(109) *Journal*, Boston Soc. C. E., Boston, Mass., 50c.
(110) *Journal*, Am. Concrete Inst., Philadelphia, Pa., 50c.
(111) *Journal of Electricity, Power and Gas*, San Francisco, Cal., 25c.
(112) *Internationale Zeitschrift für Wasser-Versorgung*, Leipzig, Germany.
(113) *Proceedings*, Am. Wood Preservers' Assoc., Baltimore, Md.
(114) *Journal*, Institution of Municipal and County Engineers, London, England, 1s. 6d.
(115) *Journal*, Engrs.' Club of St. Louis, St. Louis, Mo., 35c.
(116) *Blast Furnace and Steel Plant*, Pittsburgh, Pa., 15c.

LIST OF ARTICLES

Bridges.

The Reconstruction of Koari Bridge, Great Indian Peninsula Railway. Thomas Christie Hood. (63) 1915-16, Pt. II.

Pier-Foundations of the Wanganui Bridge, New Zealand.* Robert West Holmes. (63) 1915-16, Pt. II.

Design of Flat Arches with Fixed Ends. G. R. Maguel. (11) Apr. 27.

Graphics in Bridge Design.* H. S. Jacoby. (36) May.

Salvaging Second-Hand Girder Spans.* S. J. Corey. (87) May.

Modern Heavy Traffic Destroys East River Bridge Paving.* (13) May 10.

Will Soon Complete Sciotoville Continuous Truss Bridge.* (13) May 17.

Concrete Arch Bridge for Railway Crosses River on Reverse Curve.* (13) May 24.

Suspension Bridge Solves Problem of Crossing Rio Chiriqui in Panama.* A. S. Zinn. (13) May 31.

* Illustrated.

Bridges—(Continued).

The New Burlington Bridge at Kansas City.* (15) June 8.
Tendencies in Bridge Construction: An Interview.* (13) June 14.
Bridge Renewals Under Abnormal Conditions.* (15) June 22.
Restauration de Ponts et Béton Armé Fissuré sur les Chemins de Fer prussiens.* (33) June 2.
Wettbewerb für eine Brücke über die Birs an der Redingstrasse in Basel.* (107) May 5.

Electrical.

The Mechanical Working of Lead-Covered Underground Telephone-Cables. Charles Frederick Street. (63) 1915-16, Pt. II.
Electrical Precipitation of Solids from Gases. Linn Bradley. (5) Jan.-June, 1916.
Star-Delta Method of Starting Three-Phase Motors.* (111) Serial beginning Feb. 1.
The Determination of the Sequence of Phases from Wattmeter Readings.* Gisbert Kapp. (77) Apr.
Machine-Switching Telephone Gear.* F. R. McBerty. (77) Apr.
New Apparatus and Appliances.* (27) Apr. 5.
Impedance of Steel Rails.* (27) Apr. 5.
Conductivity of Earth Conductors and Metallic Sheathing. S. Simon. (Paper read before Assoc. of Min. Elec. Engrs.) (22) Apr. 13.
Wheatstone Bridges and Some Accessory Apparatus for Resistance Thermometry.* E. F. Mueller. (Abstract of paper in *Bulletin* of Bureau of Standards.) (73) Apr. 13.
The Lumen as a Measure of Illuminating Power.* (26) Apr. 13.
Large Generator and Transformer Failures on the Rand Power Companies Systems.* A. E. Val Davies. (73) Apr. 13.
The Greaves-Etchells Electric Furnace.* (26) Apr. 13.
Tramways with Rectified Current.* (Abstract of article in the Brown-Boveri *Mitteilungen.*) (73) Apr. 13.
A Linking-up Scheme: Accrington, Haslingden and Rawtenstall.* (26) Apr. 20.
New Electrical Devices, Fittings and Plant.* (26) Apr. 20.
The Electrical Equipment of Motor Garages. (26) Apr. 20.
Range of Wireless Stations. R. Chenevix Trench. (73) Serial beginning Apr. 20.
An Electric Resistance Furnace for Melting in Crucibles.* H. C. Greenwood and R. S. Hutton. (Paper presented before the Inst. of Metals.) (47) Apr. 20.
Electric Vehicles.* C. G. Conradi. (Abstract of paper read before Derby Soc. of Engrs.) (73) Apr. 27.
High-Tension Overhead Transmission Lines. G. V. Twiss. (Abstract of paper read before Inst. of Elec. Engrs.) (73) Apr. 27; (26) Serial beginning May 11; (77) June.
Voltage Regulation of Rotary Converters.* G. A. Juhlin. (Paper read before the Inst. of Elec. Engrs.) (26) Apr. 27; (77) Apr.
Wiring with Tough Rubber Compound Cables.* W. Ellerd-Styles. (26) Apr. 27.
Electric Equipment of a 35-In. Reversing Mill. (22) Apr. 27.
Novel Features in D. C. Watt-Hour-Meter Construction. (26) Apr. 27.
Wayleaves. C. Vernier. (Paper and discussion read before Inst. of Elec. Engrs.) (77) Serial beginning May; (104) Serial beginning Apr. 20; (26) Serial beginning Apr. 27; (73) Serial beginning Apr. 27.
A New Concentric Standard Dynamometer Wattmeter for Heavy Currents: and Concentric Non-inductive Standards of Low Resistance.* A. E. Moore. (77) May.
Some Points in Connection with Engineering Specifications. J. Shepherd. (77) May.
The Insulator Situation.* W. D. Peaslee. (42) May.
Multiplexing in Cable Telegraphy.* George O. Squier. (3) May.
Electric Furnace in Making Special Steel.* Charles C. Lynde. (116) May.
Expansion Effects as a Cause of Deterioration in Suspension Type Insulators.* J. A. Brundige. (42) May.
Unusual Details in Power House Installation.* J P. Jollyman. (111) May 1.
Mechanically Operated Electric Elevator Controller.* J. Gintz, Jr. (64) May 1.
Equipment Necessary for the Cottrell Process.* (111) May 1.
Promotion in Electricity Supply Undertakings. (26) May 4.
Note on the Rating of Intermittent Motors of Large Output.* H. H. Broughton. (73) May 4.
February Central Station Statistics. (27) May 5.
Practical Talks on Controllers-Series-Type Contactors.* (64) May 8.
The Wiring Rules of the Institution of Electrical Engineers. W. R. Rawlings. (Abstract of paper read before Assoc. of Supervising Electricians.) (47) May 11; (26) Apr. 27.
The Determination of the Torque of a Direct-Current Meter.* E. Alberti. (Abstract from *Elektrotechnische Zeitschrift.*) (73) May 11.
Electro-Culture and Crop Production: Results During 1916.* (26) May 11.

* Illustrated.

Bridges (Continued).

* Illustrated.

Electrical—(Continued).

Electric Converting Machinery.* C. S. Buyers. (22) May 11.
Overhead Lines and Inductive Interference. (Abstract of report submitted to Nat. Elec. Light Assoc.) (27) May 12.
Connecticut Company's Power Plant.* (17) May 12.
Floodlighting Outdoor Substations.* M. M. Samuels. (27) May 12.
The Equilibrium of the Basic Bismuth Salts. A. Mutscheller. (105) May 15.
The Production of Magnetite Electrodes. M. De Kay Thompson and T. C. Atchison. (105) May 15.
Demand Meters of Time Lag Type.* W. A. Hillebrand. (111) May 15.
Hyperbolic Solution for Engineering Problems.* W. D. Peaslee. (111) Serial beginning May 15.
Steam *vs.* Oil Engines for Small Light Plant.* L. H. Morrison. (64) May 15.
The Ossman Phenomenon. William C. Moore. (Paper read before the Am. Electrochemical Soc.) (105) May 15.
Emergency Transformer Connections.* G. P. Roux. (64) May 15.
Principles of Power-Plant Management.* Walter N. Polakov. (Abstract of paper read before joint meeting of Boston Sections of Am. Soc. of Mech. Engrs. and Am. Inst. of Elec. Engrs.) (64) May 15.
Practical Talks on Controllers—Lockout-Type Contactors.* (64) Serial beginning May 15.
15 000-K. W. Three-Phase Turbo-Alternator For Lots-Road Power Station.* (11) Serial beginning May 18.
Experiments on Construction of Electric Bells. L. H. Howlett and W. E. King. (22) May 18.
Speed Control of Induction Motors for Steel Mill Drive. J. D. Wright. (Abstract from *General Electric Review.*) (73) May 18.
The Theory of Armature Windings.* S. P. Smith. (Abstract from *Proceedings,* Inst. of Elec. Engrs.) (73) Serial beginning May 18.
X-Rays. William J. Hancock. (Paper read before Royal Soc. of Western Australia.) (19) May 19.
Three-Phase Connections.* R. E. Uptegraff. (27) May 19.
Some Causes of Underground Cable Failure.* Henry A. Cozzens, Jr. (27) May 19.
Reconnecting Induction Motors—Diagrams of Uncommon Open-Slot Windings.* A. M. Dudley. (64) May 22.
The Electrical Study Course—Series- and Parallel-Circuit Calculations.* (64) Serial beginning May 22.
Providing for Telephone Service Requirements in Design of Large Buildings. (86) May 23.
Electric Japanning. C. D. Carlson. (Abstract of paper presented before Cleveland Eng. Soc.) (20) May 24.
Furnace Charging Machine.* (20) May 24.
Surge Breakdowns in Networks. M. J. Sarolea. (Abstract from *Revue Générale de l'Electricité.*) (26) May 25; (27) June 30.
Characteristics of Maximum-Demand Meters. W. F. Kimball. (27) May 26.
How to Detect and to Deal with Electricity Thieves.* (27) May 26.
Costliness of Light Absorption.* Roy Kegerreis. (27) May 26.
Tentative Draft of a Code of Safety Standards for Power-Transmission Machinery.* (55) June.
Electric Wave Phenomena in the Dynamo-Electric Machine.* F. Creedy. (77) June.
Electric Motor Control Gear. John T. Mould. (Abstract of paper read before Assoc. of Supervising Electricians.) (47) June 1.
The Protection of Telephone Circuits Used in Electric Power Distribution.* E. K. Shelton. (Abstract from *General Electric Review.*) (73) June 1.
A Noteworthy Symposium on Rates. (Discussion held at Pacific Coast Section of N. E. L. A.) (111) June 1.
A Self-Recording Electrometer For Atmospheric Electricity.* W. A. Douglas Rudge. (Abstract of paper in *Proceedings,* Cambridge Philosophical Soc.) (73) June 1.
Definite Time Interval Demand Meters.* W. A. Hillebrand. (111) June 1.
The Standardisation of Resistors.* (73) June 1.
Static Sub-Stations. (26) June 1.
Electric Cooking and Water Heating. (Discussion held at Pacific Coast Section of N. E. L. A.) (111) June 1.
The Manufacture of Controller Drums.* R. K. Shield. (26) June 1.
The Resistance of Earth Connections.* L. Birks and E. Webb. (Abstract of paper read before Philosophical Inst. of Canterbury, New Zealand.) (73) June 1.
Some Theoretical Aspects of Electrical Fume Precipitation.* W. W. Strong. (Paper presented at joint meeting of Am. Inst. of Min. Engrs. and Am. Electro-Chemical Soc.) (105) June 1.
What Adequate Lighting Means to Industries.* C. E. Clewell. (27) June 2.

* Illustrated.

Electrical (Continued).

Reserve Generating Machinery.* C. S. Bunce. (22) May 17.
Overhead Lines and Insulators, Inspection. (Abstract of report submitted to Sydney Corporation.) (22) May 17.
Switchboard Control, Power Plant.* (17) May 10.
Switchboards, Power Plant.* (17) May 10.
Switchboards, Outdoor Substations.* M. M. Samuels. (22) May 17.
The Equipment of the Rose Hornby Sub-Station. A. Macfarlane. (1052) May 10.
The Production of Monocyclic Electrodes. H. Le Roy Thompson and T. O. Abbiss. (1048) May 10.
Thermal Theory of Three Log Trees.* W. A. Hillebrand. (111) May 10.
Thermostatic Monitor for Electrolytic Problems.* W. O. Doolan. (111) Special Meeting May 15.
Steam vs. Oil Engines for Small Light Plant.* L. H. Jerrison. (44) May 17.
The Cleaner (Concession). Williams (Above). (Paper read before the 20th Inst.)
Chemical Soc.) (1054) May 10.
Temperature Transformations.* C. P. Steinmetz. (44) May 17.
Principles of Power Plant Management.* Walter N. Polakov. (Abstract of paper read before Penn Meeting of Junior Sections of Am. Soc. of Mech. Engrs. and Am. Inst. of Elec. Engrs.) (22) May 17.
Practical Talks on Controllers—Low-Cost Type Compensator.* (44) Lighting Section Meeting May 14.
Rotary Converters, Starting Alternator for Intermittent Power Station.* (111) May 10.
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Speed Control of Operating Motors for Coal Mill Drive. C. C. Wright. (Abstract from Canad. Engr.) (17) May 10.
The Theory of Armature Windings.* G. F. Smith. (Abstract from Proceedings Inst. of Elec. Engrs.) (22) Special Meeting May 24.
Three-Phase Windings. Williams. (Paper read before Royal Soc. of Western Australia.) (104) May 10.
Three-Phase Transformer. E. E. Cheever. (22) May 10.
Some Causes of Underground Cable Failure.* Harry A. Cheever, Jr. (22) May 10.
Transmission Insulation Tests—Discussion of Discussion Open-air Meetings.* A. M. Dudley. (1041) May 24.
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Problems for Telephone Service Engineers in Design of Large Exchanges. (Abstract from Journal Electricity.) (52) May 24. (22) June 1.
Electric Separation. C. D. Carlson. (Abstract of paper presented before Chemical Eng. Soc.) (20) May 24.
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Power Installations in Factories. M. J. Gaynor. (Abstract from Power Meeting of Electrochemical Soc.) (22) May 24. (27) June 1.
Electric Furnaces, Heating Ingot Moulds in. W. P. Hopkins. (27) May 24.
How to Test and to Deal with Electric Shocks.* (27) May 24.
Centrifugal Separation of Liquid Admixtures.* Roy Keyworth. (27) May 24.
Testing Plant of a Code of Safety Standards for Power-Transmission Machinery.* (22) June.
Electric Wave Phenomena in the Dynamo Electric Machine.* P. Cowdry. (22) June.
Electric Motor Control Gear. John T. Nicol. (Abstract of paper read before Assoc. of Engineering Electricians.) (27) June 1.
The Protection of Telephone Circuits Used in Electric Power Distribution.* E. K. Sheldon. (Abstract from Journal Electric Power.) (22) June 1.
Interworking Exemptions on Rules. (Discussion held at Pacific Coast Section of N. E. L. A.) (111) June 1.
Self-Recording Electrometer for Atmospheric Electricity.* W. A. Douglas Rohde. (Abstract of paper in Proceedings, Cambridge Philosophical Soc.) (22) June 1.
Definite Time Interval Demand Meters.* W. A. Hillebrand. (111) June 1.
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Static Set-Stations. (24) June 1.
Electric Cooking and Water Heating. (Discussion held at Pacific Coast Section of N. E. L. A.) (111) June 1.
The Manufacture of Carbon Brushes.* E. K. Sheldon. (24) June 1.
The Resistance of Earth Connections.* L. Blake and E. Webb. (Abstract of paper read before Philosophical Inst. of Canterbury, New Zealand.) (24) June 1.
Some Theoretical Aspects of Electrical Fume Precipitation.* W. W. Strong. (Paper presented at joint meeting of Am. Inst. of Min. Engrs. and Am. Electrochemical Soc.) (104) June 1.
What Advances Labeling Means to Industries.* C. E. Clewell. (27) June 8.

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Control of Direct-Current Shunt Motors.* H. D. James. (Abstract of paper read before Am. Inst. of Elec. Engrs.) (47) June 8.
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Reinforced Concrete Transmission Poles.* (26) June 8.
A Concentric Standard Dynamometer Wattmeter and Non-Inductive Standards of Low Resistance.* A. E. Moore. (Abstract from *Journal* of the Inst. of Elec. Engrs.) (26) June 8.
A Resistance Bridge For Workshop Use.* Oscar De Wette. (73) June 8.
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The Electric Arc in Wireless Telegraphy.* Eugene Murphy. (46) June 9.
Testing Insulation of Generators in Motion.* E. O. Schweitzer. (27) June 9.
Taking Care of Corner Stresses From Large D. C. Feeders.* S. L. Foster. (17) June 9.
New Source of Power for Public Service Railway (Essex Power Plant).* (17) June 9.
Electrolysis—Troubles Caused Thereby and Remedies Which May be Applied. Albert F. Ganz. (24) June 9.
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Reversal of Exciter Polarity.* M. A. Walker. (64) June 12.
Transmission-Line Formula. E. M. Richards. (64) June 12.
Coöperation Between Central Stations and Private Power Plants.* Percival R. Moses and W. F. Schaller. (Abstract of paper read before Boston Section of Am. Soc. of Mech. Engrs. and Am. Inst. of Elec. Engrs.) (64) June 12.
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Use of Power and Rates For Irrigation Pumping.* G. R. Kenny. (111) June 15.
Recent Developments in Electricity Supply at Keighley.* Harry Webber. (26) June 15.
Notes on the Installation of Starting Compensators.* (111) June 15.
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Leads For Electric Furnaces.* Arvid Lindström. (Translated from *Teknisk Tidskrift.*) (105) June 15.
Utilization Factors For Street-Lighting Units.* Eugene Peterson. (27) June 16.
Repulsion and Mutual Inductance of Reactors.* H. B. Dwight. (27) June 16.
Relation of Industrial Lighting to Safety.* C. E. Clewell. (27) June 16.
Economical Spacing of Transformers. P. O. Reyneau. (27) June 16.
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Individual Interest in Municipal Enterprise. J. Horace Bowden. (Abstract of paper presented at the Incorporated Municipal Elec. Assoc.) (104) June 22.
Heating of Dynamo Electric Machines With Various Loads and at Different Speeds.* Magnus Maclean and D. J. Mackellar. (73) Serial beginning June 22.
Timely Economy of Industrial Electric Trucks.* (27) June 23.
Legal Requirements of Factory Lighting,* C. E. Clewell. (27) June 23.
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La Fixation de l'Azote Atmosphérique. Daniel Florentin. (33) Serial beginning May 19.
L'Eclairage des Ateliers Industriels. (33) June 23.
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Electric Pumping Equipment and Notes of Interest on Union Oil Company of California's Tank Steamer *La Brea.** Hugo P. Frear. (91) Vol. 24, 1916.
Refrigeration and Refrigerator Insulation on Board Ship.* Robert F. Massa. (91) Vol. 24, 1916.
Military and Technical Considerations of Battleship Design. R. D. Gatewood. (91) Vol. 24, 1916.
On the Suitability of Current Design of Submarines to the Needs of the United States Navy.* N. L. Rogers. (91) Vol. 24, 1916.
Salvage Equipment Used in Raising Submarine *F-4.** J. A. Furer. (91) Vol. 24, 1916.
The Rolling and Floating Steel Cassions of the Levis Dry Dock, Lauzon, County of Levis, P. Q.* Lesslie R. Thomson. (5) Jan.-June, 1916.

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Chain for Distributing Power Units." H. Bailey. (4d) June 5.
Control of Diesel Electric Sheet Mixers." H. G. Adams. (Discussion of paper read before Jan. 31st of Elec. Engrs.) (4f) June 5.
Some Notes on the Measurement of the Dielectric Resistance of a Live Transformer Oil." W. W. Stebbins. (4h) June 5.
Mechanical Concrete Distribution Poles." (2d) June 5.
A Convenient Graduated Thermometer Withdrawer and Two Indicating Standards of Temperature." A. E. Moore. (Abstract from Journal of the Inst. of Elec. Engrs.) (4d) June 5.
A Portable Device for Withdrawing Thermometers." (3d) June 5.
The Present Position of Electric Cooking Apparatus." (Abstract of a Report on Cooking and Cooking Apparatus.) (3d) June 5.
The Electric Arc in Wireless Telegraphy." Eugene Mercy. (4h) June 5.
Testing Insulators of Conductors in Situ." H. D. Somerville. (2f) June 5.
Testing Core of Power Cables from Large D. C. Supplies." H. L. Hoare. (1f) June 5.
New Source of Power for Public Service Railways (Ocean Power Plant)." (4f) June 5.
Electrolysis--Possible Chemical Theories and Remedies Which May be Applied. Albert F. Ganz. (4k) June 5.
Modern Lamps and Industrial Applications." C. H. Clough. (2f) June 5.
Inverted or Rotary Converter." M. A. Walker. (4d) June 12.
Transmission-line Formulæ. E. M. Bilgram. (4d) June 12.
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Notes on Arc Spectra, and Arc Spectra of Iron Group." (4d) June 12.
Standardization of Transformers." F. J. Lydecker. (111) June 12.
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Lamps for Theatre Purposes." Arthur Lindstrom. (Translated from Teknisk Tidskrift.) (111) June 12.
Difficulties Facing Steel Casting Industry." Eugene Pedersen. (2f) June 19.
Regulation and Manual Protection of Magnets." H. H. Dalton. (2f) June 19.
Isolation of Industrial Lighting in Shops." C. M. Clowell. (2f) June 19.
Theoretical Working of Transformers." P. O. Pierson. (2f) June 19.
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Industrial Interest in Municipal Enterprise." J. Horsie Dredge. (Abstract of Paper presented at the Incorporated Municipal Elec. Assoc.) (4d) June 26.
Meeting of Committee Electric Machines With Variable Load--Question of Proposed Speeds." Mapping Weights and K. J. Medallion. (2f) Serial September June 22.
Three Elements of Industrial Power Trouble." (2f) June 26.
Local Supervision of Factory Lighting." C. M. Clowell. (2f) June 26.
Equipment for Testing Motors." H. L. Hibberd. (4d) June 26.
Power Requirements of Steel Mixtures." H. M. Hopkinson. (2f) June 26.
Lighting in Automobile Factories." C. M. Clowell. (2f) June 26.
Labor Economy of Industrial Trucks and Tractors." (2f) June 26.
La Fixation de L'Azote Atmospherique. Docteur Eichhorn. (2f) Serial beginning June 26.

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Electric Propeller Equipment and Notes on Layout on Italian 701 Completed at Monfalcone." (4d) June 5.
Notes." Trans. Inst. Naval Archs. Vol. 54. (2f) June 5.
Refrigeration and Refrigerator Installation on Diesel Ships." Robert K. Neeve. (2f) Vol. 54, 1912.
Military and Technical Considerations of Battleship Design." R. D. Gatewood. (4f) Vol. 54, 1912.
On the Suitability of Current Design of Submarines to the Needs of the United States Navy." R. I. Hoare. (4f) Vol. 54, 1912.
Marine Equipment Used in Rolling Submarine F-4." U. A. Times. (4f) Vol. 54, 1912.
The Rolling and Pitching Steel Cradles of the Lake Dry Dock, Lawson, County of Lorain, O." Lincoln R. Thompson. (5f) Jan.-June, 1912.

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Standardisation of Marine Engines for Cargo Steamers. W. V. Lang. (Abstract of paper read before Inst. of Marine Engrs.) (47) Serial beginning April 20.
The San Marcos Experiments.* (12) April 27.
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Cavitation: A Study of the Screw Propeller.* C. H. Holst. (19) May 12.
On Wake-Stream and Suction.* C. H. Holst. (11) May 18.
Engineering Contractors Recover Stranded Submarine *H-3*.* (13) May 24.
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The Design of an Oil Engine.* John F. Wentworth. (91) Vol. 24, 1916.
The Power-Forging of Chain Cables.* Frederic G. Coburn. (91) Vol. 24, 1916.
The Rectification of Benzol.* W. Newton Drew. (106) Mar.
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Early History of the Steam Engine. V. A. Wilkes. (Paper read before Nat. Assoc. of Colliery Managers.) (22) April 27.
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Metal Planers and Methods of Production. Charles Muir. (55) May.
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The Standardisation of Benzol Works Tests. Thomas B. Smith. (Abstract of paper read before Coke Oven Managers' Assoc.) (57) May 4.
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Oil Burning.* B. S. Nelson. **(55)** June.
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Leather—Treatment and Manufacture. Lloyd Balderston. (Lecture delivered before Phil. Section of Am. Chemical Soc.) **(2)** June.
Selection of Machine Tools. Willard Doud. **(25)** June.
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From Ore to Finished "National" Pipe.* N. C. Nicol. **(65)** June.
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Mixing Manufactured and Natural Gas for City Use.* Alexander B. Macbeth. (Paper read before Natural Gas Assoc.) **(83)** June 1.
How To Determine Quality of Steam in Fuel Oil Practice.* Robert Sibley and Chas. H. Delany. **(111)** June 1.
Potash from Cement at the Riverside Portland Cement Company.* **(105)** Serial beginning June 1.
Aeroplane Engine Design. Charles E. Lucke. (Abstract of Paper read before Amer. Soc. of Mech. Engrs.) **(47)** June 1; **(64)** June 26.
Desirability of Higher Price for Natural Gas. Leslie B. Denning. (Paper read before Natural Gas Assoc.) **(83)** June 1.
Features and Purposes of Steam Traps.* **(101)** Serial beginning May 11.
Explosion of a Welded Air Receiver.* **(47)** June 1.
Numerous Industrial Uses of Gas-Fired Steam Generator Entitle It to Companies' Serious Consideration.* Gilbert C. Shadwell. **(24)** June 2.
Aviation and Aerography.* Alexander McAdie. **(19)** June 2.
Indicating Gear for Internal Combustion Engines.* **(19)** June 2.
Corrosion About the Power Plant.* H. J. Macintire. **(64)** June 5.
Turbine Rope Drive with Reduction Gear.* **(64)** June 5.
Results with Superheated Steam.* B. N. Broido. **(64)** June 5.
Making Vehicle-Wheel Boxes Without the Use of Molding Machines.* Ethan Viall. **(72)** June 7
A Notable Small-Tonnage Foundry.* **(20)** June 7.
Arrangements of Geared-Head Lathes.* Reginald Trautschold. **(72)** June 7.
The Sine Bar in Machine Work.* Hugo Pusep. **(72)** June 7.
The Electric Furnace in the Foundry. Eugene B. Clark. (Abstract of paper read before Am. Foundrymen's Assoc.) **(22)** June 8.
Ball Bearings. A. Marshall Arter. (Paper read before Soc. of Engrs.) **(47)** Serial beginning June 8.
Patterns for Oval to Round Offset Elbow.* **(101)** June 8.
Combustion in the Fuel Bed of Hand-Fired Furnaces.* **(47)** June 8.
Notes on Compression and Transmission of Air.* Robert S. Lewis. **(103)** June 9.
Oil Engines as a Relief Against Coal Prices.* A. A. Potter. **(27)** June 9.
Utilizing Coal-Mine Waste.* Henry Hull. **(27)** June 9.
Country Drawing Upon Stored Petroleum Reserve. V. H. Manning. (From Address before Editorial Conference of the Business Publishers' Assoc.) **(24)** June 9.
Extraction of Light Oils on a Small Scale.* Norton H. Humphrys. **(24)** June 9.
Tests of Atmospheric Ammonia Condenser.* G. H. Crawford. **(64)** June 12.
Review of Condenser-Tube Corrosion. Charles H. Bromley. **(64)** June 12.
Economizer Explosion Explained.* **(64)** June 12.
Report of the Joint Committee on the Life of Gas-Meters of the Institution of Gas Engineers. **(66)** June 12.
Hot and Cold Sizes of Firebricks. J. W. Mellor. (Paper read before Inst. of Gas Engrs.) **(66)** June 12.
New Requirements in Motor Workmanship.* Fred. H. Colvin. **(72)** June 14.
Hammering, Pressing or Rolling Steel.* John L. Cox. (Abstract of Paper read before Am. Iron and Steel Inst.) **(20)** June 14.
Proposed Safety Code For Ohio Industries. **(20)** June 14.
A System for Rejuvenating Machine Tools.* **(20)** June 14.
Electric Spot-Welding Operations on Automobile Lamps.* **(72)** June 14.
Some Tests on Coke Firing.* **(73)** June 15.
Recovery of Benzol and Its Homologues From Coal Gas.* J. E. Christopher. **(57)** Serial beginning June 15.
Wrought Iron Pipe in the Natural Gas Fields.* James Aston. (Paper read before Natural Gas Assoc.) **(83)** June 15.
The Steam Calorimeter and Its Use in Fuel Oil Practice.* Robert Sibley and Chas. H. Delany. **(111)** June 15.

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Mechanical—(Continued).

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Mechanical—(Continued).

Coal Concreted From Ashes or Dusts. R. Goulburn Lovell. (Abstract of Paper read before Soc. of Architects.) (73) June 15.
The Testing of Lubricating Oils.* Hugh K. Moore and G. A. Richter. (103) June 15.
Producer Gas and Its Industrial Uses. F. W. Steere. (Paper read before Soc. of Detroit Chemists, Am. Chem. Soc.) (105) June 15; (20) June 7.
The After-War Development of the Gas Industry.* Alph. Mailhe. (Translated by Frederick W. Scholz from *Revue Generale des Sciences.*) (83) Serial beginning June 15.
Gas-Fired Boilers. William B. Woodhouse. (73) June 15.
Anthracite Coal. W. H. Booth. (26) Serial beginning June 15.
Production and Consumption of Gasoline in the United States. Van. H. Manning. (Address before Editorial Conference of the Business Publishers Assoc.) (83) June 15.
Refractory Materials. (Report of Committee before Inst. of Gas Engrs.) (22) June 15; (57) June 22; (66) June 12.
Gas Burners For The Firing of Boilers.* (73) June 15.
Grates For Coke Firing.* (73) June 15.
Baltimore Company's Appliance Testing Laboratory Protects Interests of Consumer and, at the Same Time, is of Benefit to the Manufacturer.* H. M. Riley. (24) June 16.
The Foundry Today. Benj. D. Fuller. (Paper presented before Cleveland Eng. Soc.) (19) June 16.
New Woods for Paper Pulp.* Otto Kress. (46) June 16.
Benzol Recovery and Refining Plant for Small Gas-Works.* D. Bagley. (66) June 19.
Prolonging Belt Life.* Otis L. Helfrich. (76) June 19.
The Law of Partial Pressures. H. J. Macintire. (64) June 19.
Future Lines of Advance in Coking Practice. George E. Foxwell. (Abstract of Paper read before Yorkshire Section of Soc. of Chemical Industry.) (66) June 19.
Peat, Wood and Lignite in Gas Making. (Abstracts of Papers read before Congress of the Société Technique du Gas.) (66) June 19.
Treatment of Hydrocarbon Fuels. H. G. Chatain. (Abstract of Paper presented at Soc. of Automotive Engrs.) (64) June 19.
New Gas-Works For Barrow-in-Furness.* (66) June 19.
Elland and Its Gas-Works.* (66) June 19.
Endurance-Efficiency Pump Tests.* L. A. Quayle. (64) June 19.
Combination Absorption and Compression Refrigeration Systems.* B. Thoens. (64) June 19.
Determining Pipe-Main Sizes.* Alfred Iddles. (64) June 19.
How Automobile Starters are Made.* (72) June 21.
The Spontaneous Firing of Coal. J. S. Haldane. (Abstract of paper read before Inst. of Min. Engrs.) (22) June 22; (57) June 22.
Fuel Economy. J. A. Robertson. (Abstract of Paper read before Convention of Incorporated Municipal Elec. Assoc.) (73) June 22; (57) June 29.
Precautions in Fuel-Oil Storage. P. A. Colwell. (Abstract of Paper read before Providence Eng. Soc.) (64) June 26.
Experiences in the Distribution of Mixed Gases at Los Angeles, Cal. Norton H. Humphrys. (66) June 26.
A Discussion on Fuel Economy. (Discussion of J. A. Robertson's Paper read before Incorporated Municipal Elec. Assoc.) (66) June 26.
Continuous Removal of Soot.* (64) June 26.
Dexter Gate Valve Reseating Machine.* (64) June 26.
The Selection of a Lubricating Oil.* H. J. Macintire. (64) June 26.
Welds—The Weakness and Merits of Their Structure.* P. A. E. Armstrong. (64) June 26.
Defects in Finished Rolled Steel.* George W. Dress. (20) June 28.
Equivalent Cost of Coal and Oil as Fuel.* R. L. Wales. (16) June 30.
An Analysis of the Tidewater Pooling Plan. (45) June 30.
Instructions Pratique pour la Détermination du Pouvoir Calorifique du Gaz.* Ville de Paris, Services Généraux d'Eclairage. (43) Mar.
La Culture Mécanique en France.* Ch. Dantin. (33) April 14.
Les Electro-Aimants de Levage.* J. Vichniak. (33) April 21.
Les Installations pour le Transbordement et l'Emmagasinage du Charbon aux Extrémités du Canal de Panama. A. Dumas. (33) June 9.
Nouvelles Fonderies Américaines, Fonderies de Kenosha (Wisconsin) et de Cranston (New England).* (33) June 30.
Dampferzeugung durch Elektrizität mit Wärme-Aufspeicherung.* E. Höhn. (107) Apr. 28.
Bericht über neue Geschwindigkeits-Regulatoren, Modell 1916, von Escher Wyss & Cie., Zurich.* Franz Prásil. (107) Serial beginning June 9.

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Mechanical—(Continued).

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Metallurgical.

Potash as One Blast Furnace By-Product. R. J. Wysor. (116) April.
Silica as a Component of Furnace Slags.* Wallace G. Imhoff. (116) April.
Roll Scale as a Factor in Bessemerizing. A. Patton and F. N. Speller. (116) April.
Refractory Linings and Materials. J. W. Haulman. (116) Serial beginning April.
Coal-Gas as a Fuel for Melting Non-Ferrous Alloys.* George Bernard Brook. (Abstract of paper read before the Inst. of Metals.) (47) Apr. 20.
An Electric Resistance Furnace for Melting in Crucibles.* H. C. Greenwood and R. S. Hutton. (Paper presented before the Inst. of Metals.) (47) Apr. 20.
The Use and Abuse of Steel.* R. K. Bagnall-Wild and E. W. Birch. (12) Serial beginning April 27; (47) Serial beginning May 25.
The German Steel Syndicate and the British Steel Industry. W. J. Ashley. (Abstract of Paper read before Staffordshire Iron and Steel Inst.) (22) April 27.
Ferromanganese in the Iron and Steel Industry.* Robert J. Anderson. (3) May.
Requirements in the Treating of Materials. F. F. Beall. (62) May.
Characteristics of Electric Furnace Slags. Wallace G. Imhoff. (116) May.
The Penetration of the Hardening Effect in Chromium and Copper Steels. L. Grenet. (Abstract of Paper read before Iron and Steel Inst.) (22) May 4.
The Influence of Surface Tension Upon the Properties of Metals, Especially of Iron and Steel. F. C. Thompson. (Abstract of Paper read before Iron and Steel Inst.) (22) May 4.
Percentage of Oil in Flotation. Herbert A. Megraw. (16) May 5.
Counter-Current Decantation System.* Algernon Del Mar. (16) May 5.
Machinery and Steel Plant Labor. Charles Reitell. (20) May 10.
Modern Concentration of Colorado Tungsten Ores.* S. Fischer, Jr. (105) Serial beginning May 15.
The Electrolytic Pickling of Steel. M. De Kay Thompson and O. L. Mahlman. (20) May 17.
History and Legal Phases of the Smelting-Smoke Problem. Ligon Johnson. (Paper presented before Am. Inst. of Min. Engrs.) (16) Serial beginning May 19.
The Cascade Flotation Machine.* Clifford R. Wilfley. (16) May 19.
Alloys of the Non-Ferrous Metals. W. M. Corse and G. F. Comstock. (Abstract of Paper read before Steel Treating Research Club of Detroit.) (47) May 25.
Electric Iron Smelting. J. O. Boving. (22) May 25.
Petrography as an Aid to Flotation.* Donald G. Campbell. (16) May 26.
Leaching of Low-Grade Copper Ores.* Joseph Irving. (16) May 26.
Steel and Steel Alloys. G. N. Pingriff. (19) May 26.
The Media Mill, Webb City, Mo.* H. B. Pulsifer. (Abstract from *Bulletin*, Am. Inst. of Min. Engrs.) (16) May 26.
Sintering Flue Dust at Mingo Junction.* H. V. Schiefer. (20) May 31.
Notes Upon the Hydrometallurgical and Electrolytic Treatment of Zinc Ore. E. E. Watts. (Paper read before Am. Chemical Soc.) (105) June 1.
Chemical Reactions of Iron Smelting. Walter Mathesius. (Paper read before Am. Iron and Steel Institute.) (105) June 1; (20) June 21.
Alloys of Chromium, Copper, and Nickel. (47) June 1.
Cyaniding at Comacaran Mines, Central America.* William M. D'Arcy. (16) June 2.
New Tramway at the Tacoma Smeltery.* W. C. Kuhn. (16) June 2.
Metallurgy of Ferromanganese. Robert J. Anderson. (Abstract from *Iron Trade Review.*) (16) June 2.
Non-Reversing Regenerative Furnace For Copper Smelting.* Walter G. Perkins. (103) June 2.
Mayari and Nickel Steels Compared. S. W. Parker. (20) June 7.
Electric Resistance Furnace.* (Abstract of Paper read before Inst. of Metals.) (20) June 7.
Electric Process For Small Steel Castings. R. F. Flintermann. (Abstract of Paper read before Am. Electrochemical Soc.) (47) June 8; (22) June 8; (20) May 10.
Ferro-Manganese in the Iron and Steel Industry. Robert J. Anderson. (Abstract of Communication to the *Journal* of the Franklin Inst.) (47) June 8.
Progress of the Electric Steel Industry. John A. Mathews. (Abstract of Paper read before the Am. Electro-Chemical Society.) (47) June 8; (20) May 10; (22) June 8; (26) June 22.
Pneumatic Concentrator and Amalgamator.* Frank A. Stanley. (16) June 9.
Theory of Ore Flotation.* H. P. Corliss and C. L. Perkins. (103) June 9.
Impurities in Electrolytic Copper Refining.* Lawrence Addicks. (105) June 15.
Notes on Electric Steel Melting. J. L. Dixon. (Abstract of paper read before Am. Electrochemical Soc.) (22) June 15.
The Bethlehem 10-Ton Girod Steel Furnace. C. A. Buck. (Abstract of Paper read before Am. Electrochemical Soc.) (22) June 15.

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Metallurgical—(Continued).

The Rennerfelt Electric Furnace. C. H. Vom Baur. (Abstract of Paper read before Am. Electrochemical Soc.) (22) June 15; (20) May 17; (26) June 29.
Laws of Distribution of Lead in Southeast Missouri Ores. Sergio Bagnara. (16) June 16.
Volumetric Chromate Determination of Lead. John Waddell. (103) June 16.
American Smelting and Refining Company's Tests With Sulphur and Sulphuric Acid on Soils.* P. J. O'Gara. (103) June 16.
Carbon Monoxide Dangers at Iron Works. (20) June 21.
Crude-Oil Melting Furnace.* (Abstract of Paper read before Inst. of Metals.) (20) June 21.
Open-Hearth Furnace of Large Capacity.* (20) June 21.
The Metallurgy of Ferrosilicon.* Robert J. Anderson. (Abstract from *Iron Trade Review.*) (16) June 23.
The Heat Treatment of Large Forgings.* William Beardmore. (Abstract of Paper read before Inst. of Mech. Engrs.) (20) June 28.
The Empirical Formula in Milling Control. A. J. Sale. (103) June 30.
An Ore-Testing Laboratory. Carl J. Trauerman. (16) June 30.

Military.

Papers on Munitions, with Bibliography, read before the Spring Meeting of the American Society of Mechanical Engineers. (55) May; (20) Serial beginning May 10.
Road Work in Mexico With the Punitive Expedition.* James A. O'Connor. (100) May-June.
Triton Electroplating Plant at Washington Barracks, D. C. R. W. Crawford. (100) May-June.
Relation of the Gas Industry to Military Needs. J. H. Burns. (Paper read at Annual Convention of the Pennsylvania Gas Assoc.) (83) May 1.
Silent Warfare.* Nicholas Flamel. (19) May 12.
A Mining Engineer's Experience in the Artillery.* T. A. Rickard. (103) May 12.
The Gage Problem in Rifle Manufacture. John Q. Tilson. (20) May 17.
The Blind Sufferers From the War, and Their Future Employment. C. Arthur Pearson. (29) May 18.
Motor Traction in Modern War.* Victor W. Page. (46) May 19.
United States Munitions: 3 to 6-in. Cartridge Cases.* (72) May 24.
Military Engineering.* Albert K. Dawson. (46) May 26.
The Equipment of an Army. (19) May 26.
United States Munitions: The Springfield Model 1903 Service Rifle.* (72) Serial beginning May 31.
Preparedness. A. M. Lockett. (55) June.
Electrical Communication in the Field.* (26) June 1.
The Mathematics of Warfare.* J. Malcolm Bird. (19) June 2.
The Modern Automobile Torpedo.* Edward F. Chandler. (46) June 2.
The More Recent Applications of Electricity in the Present War, Especially in the Treatment of Diseases and Wounds Arising Therefrom.* W. Leeming. (26) June 15.
Naval and Military Searchlights.* Charles Osmond Knowlton. (72) June 21.
Transportation of Military Traffic.* (15) June 22.
Sixteen Cities For the New National Army. (20) June 28.
La Fabrication des Principales Matières Explosives et l'Utilisation des Produits Résiduaires. J. Meunier. (33) Serial beginning Apr. 28.
Nouvelles Usine Vickers pour la Fabrication des Mitrailleuses.* (33) June 16.
Batteries Américaines de Gros Calibre Mobile sur Voies Ferrés.* (33) June 16.
Ein artilleristiches Problem. F. Bützberger. (107) May 5.

Mining.

Further Notes on Safety-Lamps.* Simon Tate. (106) Mar.
The "Chalmers-Black" Non-Accumulative Visual Indicator for Shaft-Signalling.* John B. Thomson. (106) Mar.
The Cementation Process as Applied to Mining (François System). Thomas Blandford. (106) Mar.
Principles of Coal Washing. Henry Louis. (Paper read before Northern Section of the Coke Oven Managers' Assoc.) (57) Apr. 5.
Surface Subsidence Due to Mining Operations.* (11) Apr. 13.
Installation and Maintenance of Underground Plant.* W. Matthew Baird, Jr. (Paper read before Assoc. of Mining Engrs.) (22) Apr. 13.
Some Practical Notes on the Economical Use of Timber in Coal Mines.* F. C. Lee. (From paper read before the North of England Inst. of Mining and Mech. Engrs.) (57) Apr. 20.
Sources of Oil Supply. John Thompson. (Read before National Assoc. of Colliery Managers.) (22) Apr. 27.

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Washington—Continued.

The Monongahela Aqueduct, D. C. The Dam. (Abstract of Paper read before Engrs. Soc. of Western Pa.) (23) Jan. 31; (26) May 21; (29) June 20.

Laws of Navigation of Land by Eminent Domain Adv. Supply Bulletin. (16) June 15.

Waterworks Economy, Investigation of Local. Info. Wanted. (102) June 14.

Waterworks Service and Pumping Engine Tests. W. D. Hopkins and Ralph Weymouth. (Abstract of Paper read before Engrs. Soc. of W. Pa.) (24) June 21.

Carbon Monoxide Emission from Stacks. (26) June 25.

Chemical Mixing Process. (Abstract of Paper read before Inst. of Mining Engrs.) (29) June 27.

The Analysis of Precipitation.* Robert E. Horton. (Abstract from Bull. Weather Bureau.) (19) June 22.

The Flood Prevention of Lake Keuka.* William Dewitt. (Abstract of Paper read before Engrs. Club of Roch.) (20) June 25.

The Natural Cements in Spring Creek. A. C. Hale. (18) June 30.

An Ore Testing Laboratory. Carl A. Ziegenfus. (17) June 30.

Miller.

Topics on Questions with Illustrations. Read Before the Spring Meeting of the Southern Society of Mechanical Engineers. (30) May 4; (32) Serial begin May 11.

Road Work to Derive With the Profits Considered.* James A. Greaves. (109) May 4.

Tube Shot-Loading Plant at Washington Barracks, D. C. W. W. Crawford. (109) May 4.

Duties of the Jury Industry vs. Military Needs. J. M. Dwyer. (Paper read at Annual Meeting of the Pennsylvania Bar Assn.) (31) May 1.

Silent Workers.* Wooding Diehl. (19) May 2.

A Mining Engineer's Experience in the Artillery.* T. A. Richard. (103) May 12.

The Coca Problem in Rifle Manufacture. John O. Tilton. (20) May 12.

The Coal Industry* From the War and Their Relation Thereto. C. Arthur Pearson. (29) May 12.

Money Tramps in Mining Work.* Victor W. Page. (108) May 19.

Military Engineering.* Albert R. Dawson. (108) May 20.

The Equipment of an Army. (19) May 26.

Coking Plans Sometimes* The Superheated Steam Coke Oven Rights.* (23) Serial beginning May 21.

Preparedness. J. W. Jordan. (28) June.

Electrical Conservation in the Field.* (24) June 1.

The Machineries of Warfare.* L. Melville Lind. (19) June 2.

The Modern Automobile Torpedo.* Edward E. Thurston. (108) June 2.

The Many Novel Applications of Electricity in the Present War. Especially in Connection with Submarines and Warships. Arthur Dervishon.* W. Lawrence. (24) June 14.

The Treatment of Diseases and Wounds. Arthur Dervishon.* W. Lawrence. (24) June 14.

Naval and Military Searchlights.* Charles Osmond Knowlton. (23) June 21.

Transportation of Military Trains.* (19) June 22.

Picture Cable for the New National Army. (20) June 26.

La Fabrication des Projectiles Explosifs en Utilisation des Produits Metallurgiques. J. Jouaire. (32) Serial beginning May 26.

Montagnes. J. Jouaire. (32) Serial beginning Apr. 28.

Nouvelles Lois Velaces pour la Fabrication des Artillieuses.* (32) June 12.

Diferentes Ameliorations de Cone Culbre Mobile sur Voie Ferree.* (32) June 19.

Un artificielles Problems. P. Dibbelgen. (107) May 2.

Mining.

Purifier Mines en Salary-Lampe.* Simon Tal. (109) Mar.

The "Chemiscope-Glass."* New Accumulative Visual Indicator for Small-Signalling.* John C. Thomson. (109) Mar.

The Cementation Process as Applied to Mining (Frasch System). Thomas Blandford. (109) Mar.

Principles of Coal Washing. Henry Louis. (Paper read before Northern Section of the Coke Oven Managers' Assn.) (37) Apr. 6.

Surface Subsidence Due to Mining Operations.* (11) Apr. 12.

Installation and Maintenance of Underground Phone.* W. Matthew Hunt. 12.

(Paper read before Assoc. of Mining Engrs.) (32) Apr. 12.

Some Practical Notes on the Economical Use of Timber in Coal Mines.* P. G. Lee. (From paper read before the North of England Inst. of Mining and Mech. Engrs.) (37) Apr. 20.

Supply of Oil Supply. John Thompson. (Read before National Assn. of Coal-Tar Distillers.) (32) Apr. 27.

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Mining—(Continued).

Philippine Coals and Their Use. F. R. Yeasiano. (57) April 27.
Mine Gas. W. W. Chernitzyn. (Abstract.) (57) Serial beginning April 27.
Some Practical Notes on the Economical Use of Timber in Coal Mines.* F. C. Lee. (106) May.
Electric Supply to Collieries.* G. S. Corlett. (Paper read before the Manchester Geological and Min. Soc.) (106) May; (47) April 27.
Observations on the Order of Working the Coal Seams in the North of England. Wm. D. Harbit. (22) Serial beginning May 4.
Pumping Potash from Nebraska Lakes.* R. P. Crawford. (16) May 5.
Concentrating Canadian Molybdenite. H. H. Claudet. (Paper read before Canadian Mining Inst.) (16) May 5.
Operation of the Yukon Placer Act.* C. A. Thomas. (16) May 5.
Recent Developments of the Whiting Hoist in Deep Winding.* B. Gray and J. Whitehouse. (Abstract from *Journal* of South African Inst. of Engrs.) (57) May 11.
Mine Water as Boiler Feed. Edwin M. Chance. (Abstract from *Coal Age.*) (57) May 11.
Anaconda Copper Mining Co. (16) May 12.
Mining Methods in Great Britain.* (Abstract from *Mine and Quarry.*) (45) May 12.
Coal Mining in the Transvaal. C. C. Smith. (45) May 12.
Righting a Wrecked Gold Dredge.* Lewis H. Eddy. (16) May 12.
The Kirkland Lake Gold District.* J. C. Bateman. (103) May 15.
Accident Prevention in Quarrying. (86) May 16.
Electric Winding at Victoria Colliery, Ebbw Vale.* (26) May 18.
The Future of the Iron and Coal Industries in Normandy.* (22) May 18.
Nevada Consolidated Copper Co.* (16) May 19.
Picturesque Side of Jerome.* A. J. Hoskin. (16) May 19.
Working Dirty Beds of Coal.* Rowland Gascoyne. (45) May 19.
The Anthracite Situation. William Griffith. (45) May 19.
Amortization and Depreciation: A Discussion. W. P. Sleeman. (103) May 19.
Henry C. Perkins, and the Cost of Mining: An Interview.* T. A. Richard. (103) May 19.
Molybdenum in the Hualpai Mountains.* L. Webster Wickes. (103) May 19.
Use of Explosives in Quarrying Shale. C. B. Willis. (Paper read before Inst. of Paving.) (76) May 22.
New Method for Mining Bituminous Coal in Connellsville, U. S. A.* Patrick Mullen. (22) May 25.
Deep Creek, Clifton Mining District, Utah.* A. E. Custer. (16) May 26.
Drill-Sharpening.* (103) May 26.
Spontaneous Combustion in Coal Mines. Rowland Gascoyne. (45) May 26.
The Romance of Refrigeration and Its Application to Mining.* Andrew D. Brydon. (Abstract of Paper read before Nat. Assoc. of Colliery Mgrs.) (45) May 26.
Tipple at Powhatan in Pocahontas Field.* Henry J. Edsall. (45) May 26.
Rotary Dump Installed Underground.* E. L. Berger. (45) May 26.
Magnetic Segregation and Ore Genesis. Joseph T. Singewald, Jr. (103) May 26.
Sampling an Erratic Orebody. L. A. Parsons. (103) May 26.
Nickel in Ontario. (29) Serial beginning June 1.
Colliery Managers' Examination Papers.* (22) June 1.
Quarrying Limestone Underground.* Raymond B. Ladoo. (16) June 2.
Concreting a Creek Channel.* C. W. Wardle. (16) June 2.
Anthracite Coal Strippings Near Scranton and Wilkes-Barre, Penn.* Thomas F. Kennedy. (45) June 2.
Some Theories on Mine Subsidence. J. F. Kellock Brown. (45) June 2.
The Extralateral Right: Shall It Be Abolished? William E. Colby. (103) June 2.
The Pazña Tin-Mining District, Bolivia.* Francis Church Lincoln. (103) June 2.
Mining Problems on the Rand.* H. Foster Bain. (103) Serial beginning May 26.
Grade Revision For Underground Haulage. R. D. Brown. (57) June 8.
The Belmont Camp, Nevada.* Wilson W. Hughes. (16) June 9.
The Mining Industry of Peru. F. C. Fuchs. (16) June 9.
Occurrence and Utilization of Antimony Ores. (Abstract from *Bulletin* of the Imperial Inst.) (16) June 9.
Siberian Mine-Timbering Methods.* Henry M. Payne. (16) June 9.
Double-Range System of Speed Control For Adjustable-Speed Induction Motors.* F. B. Crosby. (45) June 9.
Drilling and Shooting Coal. F. C. Pick. (45) June 9.
Revival of Mining at Marysville, Montana.* L. S. Ropes. (103) June 9.
Perseverance Mine Powder-Thawer.* D. J. Argall. (103) June 9.
The Higher Training of Managers. G. L. Kerr. (Abstract of Paper read before Mining Inst. of Scotland). (22) June 15; (57) June 15.

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Mining—(Continued).

Methods of Mining in the Pennsylvania Anthracite Field. Hugh M. Crankshaw. (Abstract of Paper presented to Manchester Geological and Mining Soc.) (22) June 15; (57) June 15.
Cannop Colliery and Its Water Difficulties. Jno. J. Joynes. (Paper read before the Forest of Dean Branch of the Nat. Assoc. of Colliery Managers.) (22) June 15.
Acetylene Mine Lamps.* William Maurice. (Abstract of paper read before Inst. of Min. Engrs.) (22) June 22; (57) Serial beginning June 15.
The Clarification of Mill Water. G. Nicolai. (Abstract from *Metal und Erz.*) (16) June 16.
Disregard of Danger the Cause of Mountain King Fatalities. Lewis H. Eddy. (16) June 16.
"Caliche" Deposits of Atacama Desert, Chile.* Fred MacCoy. (16) June 16.
How Best to Eliminate the Bigger Mine Accidents.* Frank Haas. (Abstract of Paper read before West Virginia Coal Mining Inst.) (45) June 16.
Anaconda's Finances.* W. R. Ingalls. (16) June 16.
Mining: The Great Adventure. T. A. Richard. (Address delivered before Colorado School of Mines.) (103) June 16.
The Miami Appeal: Majority Opinion of the U. S. Circuit Court of Appeals, Philadelphia. (103) Serial beginning June 16; (16) Serial beginning June 23.
Lump-Coal Storage and Reclaiming Plant* H. M. McFarland. (45) June 23.
California Dredge With Four Tailings Conveyors.* Lewis H. Eddy. (16) June 23.
Manitoba as a Mining Province.* J. A. Campbell. (16) June 23.
The Black Oak Mine.* W. H. Storms. (103) June 23.
Automatic Skips in Shaft With Rope-Guides.* H. Vincent Wallace. (103) June 23.
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The Decimal System of Coinage, Weights and Measures. Harry Allcock. (Abstract of a lecture before Inst. of Civ. Engrs.) (104) Serial beginning April 20.
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Mining.—(Continued.)

Methods of Mining in the Transvaal.—Address (Pres.) by W. Cullen. (Trans. Inst. Min. Eng., Aug. 1917, pp. 1–15.)

Notes on Timber Preserving.—Paper read before Inst. Min. Eng. by A. Dickinson. (Trans. Inst. Min. Eng., Aug. 1917, pp. 16–22.)

Ore Dressing.—Paper read before Inst. Min. Eng. by T. Gray. (Trans. Inst. Min. Eng., Aug. 1917, pp. 23–30.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 31–36.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 37–41.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 42–45.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 46–49.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 50–53.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 54–57.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 58–61.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 62–65.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 66–69.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 70–73.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 74–77.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 78–81.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 82–85.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 86–89.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 90–93.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 94–97.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 98–101.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 102–105.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 106–109.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 110–113.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 114–117.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 118–121.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 122–125.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 126–129.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 130–133.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 134–137.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 138–141.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 142–145.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 146–149.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 150–153.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 154–157.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 158–161.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 162–165.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 166–169.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 170–173.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 174–177.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 178–181.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 182–185.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 186–189.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 190–193.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 194–197.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 198–201.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 202–205.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 206–209.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 210–213.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 214–217.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 218–221.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 222–225.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 226–229.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 230–233.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 234–237.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 238–241.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 242–245.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 246–249.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 250–253.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 254–257.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 258–261.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 262–265.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 266–269.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 270–273.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 274–277.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 278–281.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 282–285.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 286–289.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 290–293.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 294–297.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 298–301.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 302–305.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 306–309.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 310–313.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 314–317.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 318–321.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 322–325.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 326–329.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 330–333.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 334–337.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 338–341.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 342–345.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 346–349.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 350–353.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 354–357.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 358–361.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 362–365.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 366–369.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 370–373.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 374–377.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 378–381.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 382–385.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 386–389.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 390–393.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 394–397.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 398–401.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 402–405.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 406–409.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 410–413.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 414–417.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 418–421.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 422–425.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 426–429.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 430–433.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 434–437.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 438–441.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 442–445.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 446–449.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 450–453.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 454–457.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 458–461.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 462–465.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 466–469.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 470–473.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 474–477.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 478–481.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 482–485.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 486–489.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 490–493.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 494–497.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 498–501.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 502–505.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 506–509.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 510–513.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 514–517.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 518–521.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 522–525.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 526–529.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 530–533.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 534–537.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 538–541.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 542–545.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 546–549.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 550–553.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 554–557.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 558–561.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 562–565.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 566–569.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 570–573.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 574–577.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 578–581.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 582–585.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 586–589.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 590–593.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 594–597.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 598–601.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 602–605.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 606–609.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 610–613.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 614–617.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 618–621.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 622–625.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 626–629.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 630–633.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 634–637.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 638–641.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 642–645.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 646–649.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 650–653.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 654–657.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 658–661.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 662–665.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 666–669.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 670–673.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 674–677.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 678–681.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 682–685.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 686–689.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 690–693.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 694–697.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 698–701.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 702–705.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 706–709.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 710–713.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 714–717.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 718–721.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 722–725.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 726–729.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 730–733.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 734–737.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 738–741.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 742–745.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 746–749.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 750–753.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 754–757.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 758–761.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 762–765.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 766–769.)

Ore Dressing at the Mount Lyell Mines, Tasmania.—Paper read before Inst. Min. Eng. by A. Gibb. (Trans. Inst. Min. Eng., Aug. 1917, pp. 770–773

Miscellaneous—(Continued).

The Brownian Movement of Electrified Particles in Gases. A. Schidlof. (19) Serial beginning May 26.
The Application of the Modern Theory of Wages. Felix Bayle. (22) June 1.
The Fundamental Principles of Good Lighting. P. G. Nutting. (Abstract from *Journal* of the Franklin Inst.) (66) June 5.
Engineers Must Coöperate for Recognition and Service. (Address at Annual Convention of Am. Assoc. of Engrs.) Gardner S. Williams. (13) June 7.
Shall Great Britain and America Adopt the Metric System? W. R. Ingalls. (Abstract of paper read before Inst. of Min. and Metallurgy.) (73) June 8.
Chemicals for Laboratory Use. William Rintoul. (Paper read before Glasgow Section of Society of Chemical Industry.) (19) June 16.
Detecting the Pretense of Deafness.* Robert Foy. (Abstract of paper in *La Nature.*) (19) June 16.
The Engineer in Politics. Robert G. Dieck. (Abstract of Paper in *Journal* of Oregon Soc. of Engrs.) (86) June 20.
Time Studies for Delay Allowances in Rate Setting.* Dwight V. Merrick. (72) June 21.
Wages for Ability, Output and Service.* W. E. Freeland. (20) June 28.
The Human Potential in Industry. Otto P. Geier. (55) July; (20) Serial beginning May 31.
Organisation Scientifique de l'Usinage.* P. Denis. (33) Serial beginning April 14.
La Rééducation des Avengles.* Lucien Fournier. (33) May 5.

Municipal.

Municipal Work in Rangoon From 1907 to 1916.* Launcelot Paul Marshall. (114) May.
Small-Town Electric Service Problems.* (27) May 5.
Municipal Engineering in America. A. F. Macallum. (Abstract of paper read before Ottawa Branch of Canadian Soc. of C. E.) (104) June 15.
Presidential Address before Inst. of Municipal and County Engrs. Philip H. Palmer. (104) June 29.

Railroads.

Notes on the Working of a Rack Railway. William Theodore Lucy. (63) 1915-1916, Pt. II.
Design of Passenger Terminals.* J. L. Busfield. (5) Jan.–June, 1916.
Grade Separation—Two Distinct Methods.* Samuel T. Wagner. (Delivered before Engineers' Soc. of Penn.) (98) Nov.-Dec., 1916.
The Federal Valuation of Railways. Towson Price. (8) April.
Doctors of Transportation. Geo. A. Post. (36) April.
American Coaling Stations for Locomotives.* George Frederick Zimmer. (11) April 13.
The Watford New Electric Train Service.* (12) April 13.
Railway Water Supply.* C. R. Knowles. (65) May.
The Locomotive Firebox and Combustion Chamber. J. T. Anthony. (Abstract of paper read before the Southern and South-western Railway Club.) (47) Apr. 20.
Tunnels.* (21) Serial beginning May.
The Chambers Regulator.* (21) May.
Enlarging a Busy Tunnel under Traffic.* (87) May.
Reclaiming Battered and Worn Rails.* John Reinehr. (87) May.
Special Track Work in Paved Streets.* H. F. Heyl. (87) May.
Boiler Patches for Locomotives.* M. J. Cairns. (25) May.
McClellon Water-Tube Firebox.* (25) May.
Straightening Surface Bent Rails.* J. Rodman. (87) May.
New Power for the Lehigh Valley.* (25) May.
Air Brake Lever Computations.* Lewis K. Silcox. (25) May.
Steel as a Material for Locomotive Fireboxes. R. P. C. Sanderson. (Abstract of paper read before Inst. of Locomotive Engrs.) (21) Serial beginning May.
Box Car Side Door.* (25) May.
Turbine for Locomotive Drive.* Victor W. Zilen. (64) May 1.
Pennsylvania Changes at Baltimore under Discussion Again.* (13) May 3.
Construction of a Comprehensive Low-Grade Line.* (15) May 4.
The Resawing of Lumber.* D. C. Curtis. (15) May 4.
Rules for the Mobilization of Freight Cars. (15) May 4.
Canadian Commission Against Public Ownership. J. L. Payne. (15) May 4.
Canadian Commission Minority Report. (15) May 4.
Origin and Development of the Railway Rail in England and America.* G. P. Raidabaugh. (Abstract of paper presented to Iron and Steel Inst.) (22) May 4.
Pennsylvania Locomotive Brick Arch Tests.* (15) May 4.

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* Illustrated.

Miscellaneous.—(Continued.)

The Drawing Examiner of Negretted Patents. (See Patents.) A. Robichet. (19)
Postal Delivery. May 26.
The Application of the Modern Theory of Waves. Emil Verin. (22) June 1.
The Fundamental Principles of Chief Importance. F. G. Jennings. (Abstract from Journal of the Franklin Inst.) (46) June 7.
Explosive Mixtures Suitable for Locomotive and Marine Engines. (Address at Annual Convention of Am. Assoc. of Engrs.) Chandler C. Whitney. (13) June 7.
Rhall Diesel Diesels and Electric Motor for Motor Scooters." W. H. Imrie. (Abstract of paper read before Inst. of Mun. and Mechanical Engrs.) (23) June 8.
Precautions for Longevity. Wm. Whitman Bleakot. (Paper read before the Engineering Section of Canadian Inst.) (38) June 14.
Inventing the Process of Inventing." Inventor. (Address of paper to Am. Soc. of Mech. Engrs.) (19) June 15.
The Relative Merits of Electric, Diesel, Steam and Gasoline Motors." Thomas Rickey. (Abstract of Paper to Journal of Electricity.) (38) June 15.
Steam Engineering. (Letter.) (38) June 20.
Time Studies for Safety Allowances in Shop Setting." Prescott C. Morrell. (22) June 21.
Wages for Ability. Method and Service." W. E. Freeman. (20) June 28.
The Human Potential in Industry. Geo P. Decker. (45) (102) (20) Serial beginning May 21.
Organization. Reflections on Efficiency." F. Trott. (12) Serial beginning April 12.
La Rémunération des Ouvriers." Lucien Pombonn. (12) May 5.

Municipal.

Municipal Work in Hamburg From 1907 to 1916." Leonarde Irwin Merchant. (114) May.
Small-Town Electric Service Problems." (12) May 26.
Municipal Engineering in America. A. F. Meredith. (Address of Paper read before Ottawa Branch of Canadian Soc. of C. E.) (19) June 12.
Presidential Address. Before Inst. of Municipal and County Engrs. Philip H. Tatham. (106) June 28.

Railroads.

Notes on the Worklog of a Test Railway. William Theodore Burt. (42) (1915-16) Pt. II.
Design of Passenger Terminals." C. L. Hosgood. (32) Jan.-June, 1916.
Grade Separation—Two Typical Methods." Manuel J. Vaquez. (Retrieved before Engineers' Soc. of Penn.) (194) Nov.-Dec., 1916.
The Federal Valuation of Railways. Towne Price. (4) April.
Inventory of Transportation. Com. A. Post. (46) April.
American Coaling Stations for Locomotives." Clarke Thompson Kingman. (11) April 12.
The Watford, New Electric Train Service." (12) April 12.
Railway Water Supply." C. H. Bowlby. (85) May.
The Locomotive Firebox and Combustion Chamber." T. T. Audley. (Abstract of Paper read before the Canadian and South-western Railway Club.) (47) Apr. 20.
Tunnels." (21) Serial beginning May.
The Chambers Regulator." (11) May.
Enlarging a Steel Tunnel under Traffic." (47) May
Reclaiming Ballasted and Worn Rails." (97) May
Special Track Work in Paved Streets." H. P. Hugo. (47) May.
Boiler Tubes for Locomotives." M. A. Cohen. (25) May.
Ventilation Water-Tube Fittings." (25) May.
Strain-Gauging Surface Cast Rails." J. Bowman. (87) May.
New Power for the Lehigh Valley." (25) May.
Air Brake Lever Computations." Lewis E. Gilbert. (25) May.
Steel as a Material for Locomotive Firebox. H. T. C. Gaudreau. (Abstract of paper read before Inst. of Locomotive Engrs.) (12) Serial beginning May.
Box Car Side Door." (25) May.
Turbine for Locomotive Drive." Victor W. Kemp. (44) May 1.
Pennsylvania Changes at Baltimore under Discipline Again." (18) May 5.
Construction of a Comprehensive Low-Grade Line." (15) May 4.
The Meaning of Landor." D. C. Curtis. (15) May 4.
Rules for the Mobilization of Freight Cars. (15) May 4.
Canadian Commission Assists Public Ownership. J. E. Payne. (45) May 4.
Canadian Commission Monthly Report. (15) May 4.
Origin and Development of the Railway Mail in England and America." G. P. Rademough. (Abstract of paper presented to (Inn and Mint Inst.) (12) May 4.
Pennsylvania Locomotive Birth Area Tests." (15) May 4.

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* Illustrated.

Railroads—(Continued).

Slack Action in Long Passenger Trains; Its Relation to Triple Valves of Different Types and Consequent Results in the Handling of Trains. J. A. Burke and William Hotzfield. (Abstract of paper read before Air Brake Assoc.) (18) Serial beginning May 5.

Handling Heavy Passenger Trains on Grades with Air Brakes Exclusively. J. E. Fitzgerald. (Abstract of paper read before Air Brake Assoc.) (18) May 5.

Safe Life of Air Brake Hose. M. E. Hamilton. (Paper read before Air Brake Assoc.) (18) May 5.

Determination of Actual Sectional Errors in Railroad Track Scales.* (18) May 5.

A 120-Tons Capacity Gondola Car for the Virginian Railway.* (18) May 5.

Railway Enquiry Commission's Report (Canada). Sir Henry L. Drayton, W. M. Acworth and Alfred Smith. (96) Serial beginning May 10; (18) Serial beginning May 5.

The Government White Elephant at Quebec.* C. V. Johnson. (96) May 10.

When to Ship Freight by Motor Truck and When by Rail? C. C. Williams. (13) May 10.

Canadian Northern Electrification at Montreal.* W. C. Lancaster. (15) May 11.

Functional Interrelation between the Component Parts of the Air Brake System.* W. E. Dean. (Paper read before Air Brake Assoc. Convention.) (15) May 11; (18) June 2.

Pennsylvania Track Elevation at Johnstown.* (15) May 11.

High-Pressure Electric Railway Systems. (26) May 11.

The Choice of Voltage for Railway Electrification on the Direct-Current System.* F. Lydall. (73) Serial beginning May 11.

The Rate Advance Case. (Abstract of Hearings before the Interstate Commerce Commission.) (18) Serial beginning May 12; (15) Serial beginning May 18.

Methods and Cost of Changing 17 Miles of Railroad Track From Narrow Gage to Standard Gage.* Henry R. Somes. (86) May 16.

The Highest Railroad Shop in the United States.* Frank A. Stanley. (72) May 17.

Offer Divers Solutions of Canada's Railway Problem. (13) May 17.

Theory, Practice and Results of Fuel Economy. W. P. Hawkins. (15) May 18; (25) June; (18) May 19.

New Union Station Plants Completed for St. Paul.* (15) May 18; (13) June 7.

Government Ownership in Foreign Countries. W. M. Acworth. (15) May 18; (18) May 12.

New Automatic Block Signals on the Southern Railway.* (18) May 19.

Would Depress New York Central and Elevate Lackawanna Through Syracuse.* (13) May 24.

Locomotive Feed Water Heating.* C. M. Moderwell. (Report at Railway Fuel Assoc. Convention.) (15) May 25; (25) June; (18) May 19.

Pattern for Locomotive Cab Window Shield.* (101) May 25.

The Julian-Beggs Automatic Stop and Train Control System.* (18) May 26.

Mountain and Santa Fe Type Locomotives for the Southern Railway.* (18) May 26.

Refrigerator Cars for the Pacific Fruit Express Co.* (18) May 26.

Progress in the Rail Problem Marked by Sharp Differences in View.* (13) May 31.

D. C. Track-Circuits. (21) June.

Flexible Firebox Stays.* (21) June.

Developments in Railway Shop Tools. (25) June.

Organization and Methods for Handling Rods.* Ernest A. Miller. (25) June.

Centralized Production of Locomotive Repair Parts.* George Armstrong. (25) June.

Electrical Equipment at a Great Western Goods Station.* (26) June 1.

Suggestions for the Conservation of Fuel. (15) June 1.

Double Deck Stock Cars for the Santa Fe.* (15) June 1; (25) June; (18) June 9.

To Increase Transportation Efficiency. Howard Elliott. (15) June 1.

The German Railway Record in China. (11) June 1.

New Kansas Interurban Line Serves Central Cities.* (17) June 2.

Mechanics of the Chilled Iron Wheel. George W. Lyndon and F. K. Vial. (Abstract of joint address before Railway Club of Pittsburgh.) (18) June 2; (51) July 27; (25) May.

Rail Failure Attributed to Track Service.* (20) June 7.

"Hold-Main" Signals on the L. & N.* (15) June 8.

The Pennsylvania's New Electric Locomotive.* (15) June 8; (17) June 9.

Modern Train Despatching—Some Needed Forms. Harry W. Forman. (15) June 8.

Mikado and Consolidation Types Compared.* (Discussion based on Testing Plant *Bulletin No.* 28 of Penn. R. R. Co.) (15) June 8; (25) June.

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* Illustrated.

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Railroads—(Continued).

The New High-Speed Three-Phase Locomotives of the Italian State Railways.* P. Verole and B. Marsili. (Abstract from *Rivista Tecnica delle Ferrovie Italiane.*) (73) June 8.
Up-State New York Lines Need Relief. Thomas Conway, Jr. (17) Serial beginning June 9.
Successful Use of Steel Trolley Wire By Pacific Railway.* S. H. Anderson. (17) June 9.
Economics of the Supply Train. D. D. Cain. (18) June 9.
A Seventy-Ton Capacity Well Car for the Pennsylvania R. R.* (18) June 9.
Train Handling. G. H. Wood. (Paper read before Car Foremen's Assoc. of Chicago.) (18) June 9.
Making Locomotive Driving Boxes.* Frank A. Stanley. (72) June 14.
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Powdered Coal. (Abstract of Committee Report at Convention of International Railway Fuel Assoc.) (15) June 15; (18) May 19.
Wheel Shop Practices, Minneapolis, St. Paul & Sault Ste. Marie Ry., Minneapolis, Minn.* (18) June 16.
Shop Fire Protection. Paul Hevener. (Paper read before Car Foremen's Assoc. of Chicago.) (18) June 16.
Steel Car Shop, Louisville & Nashville R. R., South Louisville, Ky.* Millard F. Cox. (18) June 16.
The Fuel Situation as Affected by the War. (15) June 22.
The Railroads of Canada and the War.* (15) June 22.
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Methods of Increasing the Train Load. (15) June 22.
Increasing Track Capacity by Signaling. (15) June 22.
Heavier Car Loading Would Eliminate Car Shortage.* (15) June 22.
Electricity as an Aid to Railroad Operation. (15) June 22.
Small Locomotives Used at the Front. (15) June 22.
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Construction of Wooden Freight Equipment.* (15) June 22.
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How Railways Have Revolutionized Warfare. (15) June 22.
Ambulance Trains from Civil War to Present.* (15) June 22.
Europe's Railroads Meeting Second Great Trial. (15) June 22.
Main Line Steel Passenger Cars for the Erie.* (15) June 29.
Clearing House For Inter-Railway Accounts. T. H. B. McKnight. (Abstract of paper read before Assoc. of Am. Railway Accounting Officers.) (15) June 29.
Centralizing the Handling of Timber on the B. & O. F. J. Angier. (15) June 29.
The Control of Alternating-Current Locomotives. (26) June 29.
Boulons, Goujons et Vis d'Assemblage, Règles pour la Construction des Boulons d'Assemblage.* (92) March.
Installations Américaines pour le Chargement du Charbon sur les Locomotives.* (33) May 19.
Betrachtungen über die störenden Nebenbewegungen der Eisenbahn-Fahrzeuge mit besonderer Berücksichtigung des Einflusses der Radreifen-Konizität.* U. R. Ruegger. (107) Serial beginning June 16.

Railroads, Street.

Rapid Transit Railways—Some Features of Construction and Cost.* Ernest V. Pennell. (Paper read before Toronto Section of Am. Inst. of Elec. Engrs.) (96) May 3.
Rail-Bonding Precautions.* H. H. Tebrey. (45) May 5.
Build Subway Station Beneath Philadelphia's Massive City Hall.* (13) May 10.
Extension of London Underground System.* (17) May 12.
Methods Employed in Construction of Fort Point Channel Rapid Transit Tunnel, Boston, Mass.* (86) May 16.
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Interurban Cars with Off-Set Central Vestibules.* (17) May 19.
An Inexpensive Way of Cutting Construction Costs. Frank B. Walker. (17) May 26.
Double Guards Reduce Cost.* William H. Stevenson. (17) May 26.
Putting Across the Skip Stop in Baltimore.* Dwight Burroughs. (17) June 2.
Track Construction in Des Moines.* W. L. Wilson. (17) June 2.
Typical Car-Yard Improvements at Rochester, N. Y.* D. J. Graham. (17) June 16.
Determining the "Slack" in a Schedule.* C. H. Koehler. (17) June 16.
What Shall We Do With the Paving Burden? R. C. Cram. (17) June 23.
Track and Paving Construction in Seattle, Wash.* S. E. Goodwin. (17) June 23.
A Modern Type of Track Construction.* R. G. Taber. (17) June 23.

* Illustrated.

Railroads.—(Continued).

The New High-Speed Three-Phase Locomotives of the Italian State Railways.* P. Verole and B. Morelli. (Abstract from Revue Générale de l'Electricité.) (7) June 8.

[U.S.] New York Lines Need Relief. Thomas Conway, Jr. (12) Serial begin June 8.

Recovering the of Steel Trolley Wire by Electric Welding.* A. H. Anderson. (17) June 8.

Economics of the Single Truck. O. P. Cash. (18) June 8.

A Portable Car-Lifting Wedge for the Pennsylvania R. R.* (18) June 8.

Train Heating. H. M. Wood. (Paper read before Central Railway Club.) (18) June 8.

Making Locomotive Driving Wheels.* Frank A. Stanley. (17) June 15.

Pneumatic Locomotive of the Liverpool Type.* (18) June 15.

Powdered Coal. (Letters.) (18) June 15.

Railway Fuel Value. (12) June 15. (18) May 18. (18) June 15.

Wheel Shop Practice. Edgar Worthington. (Paper read before Cent. Railway Club. Minneapolis, Minn.* (18) June 15.

Shop Practice. (Discussion.) (18) June 15.

Steel Car Truss. Louisville & Nashville R. R. Smith. Louisville Shop. Willard P. Cook. (18) June 15.

The Fuel Situation as Viewed by the Man. (18) June 22.

The Railroads of Canada and the War.* (18) June 22.

The Maintenance of Way Labor Problem.* (18) June 22.

Methods of Increasing the Train Load. (18) June 22.

Increasing Track Capacity by Signaling. (18) June 22.

Diverter Car Loading Wood Shingles for Shipment.* (18) June 22.

Electricity as an Aid to Railroad Operation. (18) June 22.

Mount Lowe Railway Used at the Panama. (18) June 22.

Railway and Road Problem in the West.* (18) June 22.

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Construction of Wooden Freight Equipment.* (18) June 22.

A Review of the Financial Situation. (18) June 22.

Improved Locomotive Smokestack.* (18) June 22.

Line Railways Have Revolutionized Warfare. (18) June 22.

Ambulance Trains from Civil War to Present.* (18) June 22.

Compressed Railroads Among Strange Trains. (18) June 22.

Main Line Steel Passenger Cars for the Erie.* (18) June 22.

Clearing Yards for Inter-Railway Accounts. T. H. & F. Nicholson. (Abstract of paper read before Assoc. of Am. Railway Accounting Officers.) (18) June 22.

Construction and Operation of Timber on the B. & O. W. C. Arndt. (18) June 22.

The Control of Interstate-Current Locomotives. (18) June 22.

Boston, Corpus of Vt. & Massachusetts. Rates pour la Construction de Voies d'Accumulation.* (12) Map 10.

Installations Accessoires pour le Chargement du Charbon sur les Locomotives.* (12) May 10.

Interconnection entre les réseaux Métropolitains de Chemins de Fer.* C. H. Bunning. (12) May 10.

Locomotive Superheating des Eisenbahnen der Niederlande-Indien.* C. H. Bunning. (12) May 10.

Material Delivered June 10.

Railroads, Street.

Rapid Transit Railways—Some Features of Construction and Cost.* Elgood V. Pennell. (Paper read before Toronto Section of Am. Inst. of Elec. Engrs.) (19) May 2

Rail-Bonding Precautions.* H. H. Tobey. (145) May 6.

Build Subway Station Beneath Philadelphia's Masonic City Hall.* (14) May 10.

Extension of London Underground System.* (17) May 10.

Methods Employed in Construction of Fort Point Channel Rapid Transit Tunnel, Boston, Mass.* (18) May 10.

Elevated Railway Rebuilt Without Stopping Traffic.* (14) May 17.

Interurban Cars with Oil-Set Control Vestibules.* (17) May 17.

An Inexpensive Way of Cutting Concrete. Frank H. Walker. (17) May 26.

Double Unwalled Timber Duct.* William H. Stevenson. (17) May 26.

Rolling Across the Ship in Baltimore.* Ivelah Darrough. (17) June 2.

Track Construction in Pre-Stone.* W. L. Wilson. (17) June 2.

Typical Car-Yard Improvements at Scranton, N. Y.* D. J. Graham. (17) June 12.

Determining the "Slack" in a Coupler.* C. H. Keeler. (17) June 16.

What Shall We Do With the Paving Blocks? H. C. Crane. (17) June 23.

Track and Paving Construction in Seattle. Work.* E. E. Goodwin. (17) June 23.

A Modern Type of Track Construction.* R. U. Taber. (17) June 23.

* Illustrated.

Roads and Pavements.

Highway Traffic Analysis and Traffic Census Procedure. William H. Connell. (Abstract of paper read before Am. Assoc. for the Advancement of Science.) (96) Mar. 22.

Road Construction and Improvement by Means of Town Planning Schemes. W. Rees Jeffreys. (Paper read at Town Planning Inst.) (104) Serial beginning April 27.

Machine Finishing of Concrete Roads.* (60) May.

Important Features Relating to the Design and Improvements of City Streets. N. S. Sprague. (58) May.

The Construction of Bituminous Pavements.* (60) May.

Methods of Handling Earth in Road Construction. Chas. R. Thomas. (86) May 2.

Estimating the Cost of Paved Surfaces for Highway Improvement. Robert E. Thomas. (86) May 2.

Methods of Determining the Roadmaking Qualities of Deposits of Stone and Gravel.* L. Reinecke. (96) May 3.

New Pavement Ordinance Helps San Francisco's Development. James M. Owens. (13) May 3.

To Pave over New York Subway with Asphalt. (13) May 10.

Road Laws of Ontario. W. A. McLean. (Abstract of paper read before Canadian and International Road Congress, Ottawa.) (96) May 17.

Intelligent Use of Road Oil Reduces Maintenance.* T. R. Agg. (13) May 24.

National Parks Road Construction.* J. M. Wardle. (96) May 24.

Staffordshire Main Roads. James Moncur. (Extract from Report for 1916-1917.) (104) May 25.

Cost Keeping Forms of Oregon State Highway Commission.* John H. Lewis. (Abstract from *Bulletin.*) (86) May 30.

Street and Road Pavements, Their Design, Construction and Maintenance: The Maintenance of Bituminous Pavements.* The Editor. (60) June.

Road Work in the Mexican Desert.* James A. O'Connor. (104) June 1.

Practice of New York State Highway Commission in Construction of Concrete Pavement. H. Eltinge Breed. (86) June 6; (67) May.

Japanese Roads and Highway Bridges.* J. L. Harrison. (86) June 6.

Method of Resurfacing Old Macadam Road. Chas. R. Thomas. (86) June 6.

Granite Block Pavements. William H. Connell. (Abstract of Paper read before Fourth Canadian and International Good Roads Congress.) (96) June 7.

Extraordinary Traffic and Excessive Weights on Highways. H. T. Wakelam. (Paper presented at meeting of Inst. of Municipal and County Engrs.) (104) June 29.

Modern Road-Making Machinery—Its Selection, Use and Care. W. Huber. (Abstract of Paper read before Canadian and International Good Roads Congress.) (104) June 8.

Sanitation.

The Capacity of Outfall Sewers.* William Fairley. (63) 1915-1916, Pt. II.

The Present Conditions of Arterial Drainage in Some English Rivers. Richard Fuge Grantham. (63) 1915-1916, Pt. II.

The Main Drainage of Cairo. Charles Carkeet James. (63) 1915-1916, Pt. II.

A Photographic Study of Sewage Distribution on a Sprinkling Filter.* C. L. Walker. (36) April.

Street Cleaning—A Problem in Sanitary Engineering. James W. Routh. (36) April.

The Dust-Bins of Greater London. Reginald Brown. (Paper read at Meeting of Inst. of Mun. and County Engrs.) (114) April; (104) May 4.

Sewage Disposal: Activated Sludge *v.* Tankers and Filters. (104) April 13.

Durability of Cement Drain Tile and Concrete in Alkali Soils.* (Abstract from *Technologic Paper No. 95.*) (3) May.

Air Diffusion in Activated Sludge.* Waldo S. Coulter. (13) May 3.

Some Costs of Sewer Work.* W. G. Cameron. (96) May 3.

Advantages of Clay Over Cement Tile. E. H. Haeger. (Paper read before Wisconsin State Drainage Assoc.) (76) May 8.

Special Features of Sewerage Development at Wellsboro, Pa.* Henry W. Taylor. (86) May 9.

Heating Two Apartments with Furnaces.* (101) May 11.

Collection and Disposal of House Refuse: Discussion. C. H. Cooper. (Abstract of Paper read at Royal Sanitary Inst.) (104) May 11.

Progress in the Use of Gas For House Heating. George S. Barrows. (Abstract of Discussion before Southwestern Gas and Elec. Assoc.) (83) May 15.

French Hygienic Tests of Gas-Fires.* (66) May 15.

Drainage Problems in Saskatchewan.* Charles S. Cameron. (96) May 17.

Hot Blast Heating for Industrial Buildings.* (101) May 18.

The Treatment of Sewage. Bertram Blount. (Abstract from *Journal* of the Inst. of Sanitary Engrs.) (104) May 18.

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* Illustrated.

Roads and Pavements.

Highway Traffic Analysis and Traffic Census Procedure. William H. Connell. (Abstract of paper read before Am. Assoc. for the Advancement of Science.) (Sci. Am. Supp., Mar. 24, 1917.)

Road Construction and Improvement by Means of Town Planning Schemes. W. Dare Jeffery. (Paper read at Town Planning Inst.) (Eng., April 27, 1917.)

Machine Finishing of Concrete Roads.* (Eng. Rec., May 5, 1917.)

Important Features Relating to the Design and Maintenance of City Streets. W. S. Stevens. (Sci. Am., May, 1917.)

The Construction of Bituminous Pavements.* (Eng. Rec., May 5, 1917.)

Methods of Handling Earth in Road Construction. Chas. H. Thomas. (Eng. Rec., May 5, 1917.)

Estimating the Cost of Paved Surfaces for Highway Improvement. Robert H. Thomas. (Eng. Rec., May 5, 1917.)

Methods of Determining the Bond-bearing Qualities of Concrete and Stone and Gravel.* L. Reinecke. (Eng. Rec., May 5, 1917.)

New Pavement Ordinance Helps San Francisco's Development. James H. Gibson. (Eng. Rec., May 5, 1917.)

To Pave new York Railway with Asphalt. (Eng. Rec., May 19, 1917.)

Road Laws of Country. W. A. Nielson. (Abstract of paper read before Canadian and International Road Congress. (Sci. Am., May 12, 1917.)

Preliminary Use of Road Oil Reduces Maintenance. T. H. Agg. (Eng. May 25, 1917.)

National Parks Road Construction.* A. H. Wyatt. (Eng. Rec., May 26, 1917.)

Picturesque Main Roads. (Surveyor, May 25, 1917.)

(Abstract from Journal.) (Surveyor, Engr. Rec., May 26, 1917.)

Coal Mining Rents of Crown Rivers Commission.* John H. Lewis. (Abstract from Journal.) (Eng., May 25, 1917.)

Street and Road Pavements. Their Design, Construction and Maintenance. The Road Work in the Boston Loop.* James A. Emmons. (Eng. June 1, 1917.)

Traffic of New York State Highway Commission in Consideration of Concrete Pavements. H. Eltinge Breed. (Eng. Rec., May 26, 1917.)

Japanese Roads and Highway Bridges.* A. L. Eberstadt. (Sci. Am., June 9, 1917.)

Method of Dismantling Old Macadam Road. Chas. H. Thomas. (Eng. June 8, 1917.)

Oneida Block Pavements. William H. Connell. (Abstract of Paper read before Fourth Canadian and International Good Roads Congress.) (Sci. Am., June 2, 1917.)

Exhibition Trucks and Tractors.* (Engineering, June 8, 1917.)

(Paper presented at meeting of Inst. of Municipal and County Engrs.) (Eng., June 29, 1917.)

Modern Road-Making Machinery—Its Selection, Use and Care. W. Hilbes. (Abstract of Paper read before Canadian and International Good Roads Congress.) (Eng., June 8, 1917.)

Sanitation.

The Capacity of Circular Sewers.* William Carey. (Eng., 1915-1916, Pt. II.

The Present Conditions of Arterial Drainage in Some English Rivers. Richard Pope (Correction.) (Eng., 1915-1916, Pt. II.

The Main Drainage of Cairo. Charles Carter James. (Eng., 1915-1916, Pt. II.

A Photographic Study of Sewage Distribution on a Percolating Filter.* C. E. Walker. (Eng., April.

Street Cleaning—A Problem in Sanitary Engineering. James W. Booth. (Eng., April.

The Dun-Dee of Greater London. Reginald Brown. (Paper read at Meeting of Inst. of Mun. and County Engrs.) (Eng., April, 1917.)

Sewage Disposal: Activated Sludge v. Trickling and Filters. (Eng., April 13, 1917.)

Durability of Concrete Drain Tile and Concrete in Alkali Soils.* (Abstract from Technologic Paper No. 93.) (Eng., May, 1917.)

Air Diffusion in Activated Sludge.* Wylde R. Cowles. (Eng., May 4, 1917.)

Some Costs of Sewer Work.* W. G. Cameron. (Eng., May 4, 1917.)

Advantages of Clay Over Cement Tile. E. H. Harper. (Paper read before Wisconsin State Drainage Assoc.) (Eng., May 4, 1917.)

Special Features of Sewerage Development at Wyandotte, Mich.* Henry W. Taylor. (Eng., May 4, 1917.)

Heating Two Apartments with Furnaces.* (Eng., May 11, 1917.

Collection and Disposal of House Refuse: Discussion. C. H. Cooper. (Abstract of Paper read at Royal Sanitary Inst.) (Eng., May 11, 1917.)

Progress in the Use of Gas For Home Heating. George B. Harrows. (Abstract of Discussion before Southwestern Gas and Water Assoc.) (Eng., May 18, 1917.)

French Hygienic Tests of Gas-Fires.* (Eng., May 18, 1917.)

Drainage Problems in Saskatchewan.* Charles A. Cameron. (Eng., May 25, 1917.)

Hot Blast Heating for Industrial Buildings.* (Eng., May 18, 1917.)

The Treatment of Sewage. Bertram Blount. (Abstract from Journal of the Inst. of Sanitary Engrs.) (Eng., May 18, 1917.)

* Illustrated.

Sanitation—(Continued).

Combining Power, Heating and Ventilation.* Ira N. Evans. (64) Serial beginning May 22.
Western Cities Employ Vacuum Machines for Cleaning Streets.* (13) May 24.
Effect of Ruthless Competition on Heating Work.* (101) May 25.
Sewage Disposal in the Wanstead (Essex) Urban District. Edward Lindon. (Abstract of Paper read before Assoc. of Managers of Sewage Disposal.) (104) May 25.
Methods and Costs of Supervising Drainage Construction in the Little River Drainage District.* B. F. Burns. (86) May 30.
Septic Tanks Reconstructed as Imhoff Tanks at Columbus: Part I—Governing Conditions and Main Results.* C. P. Hoover. (13) May 31.
Marked Advance in Treating Sewage from Packing Houses. G. B. Zimmele. (13) May 31.
Saving Expense in Garbage Collection—A Study of Actual Conditions in Billings, Montana.* John N. Edy. (60) June.
Rochester's Sewage Disposal Plant in Operation. (60) June.
Modern Methods of Refuse and Garbage Disposal. (60) June.
Swimming Pool Heating and Filtering Plant.* (101) June 1.
Proper Method of Laying Out Trunk Mains.* J. G. Sorgen. (101) June 1.
How to Keep a Construction Camp Clean and Sanitary. (13) June 7.
Motor Vehicles the Key to New York Street-Cleaning Problem.* J. T. Fetherston. (13) June 7.
Heating Combined Bank and Office Building.* (101) June 8.
Hospital for the Care of Wild Animals.* A. Mann. (101) June 8.
Plumbing System on a "Land" Battleship.* (101) June 8.
Operating Results of Imhoff Tank Sewage Disposal Works of Fitchburg, Mass. F. W. Jones. (Abstract of Report.) (86) June 13.
Activated Sludge Experimental Work at Milwaukee.* (Abstract of Report of Milwaukee Sewage Commission.) (96) June 14.
Extracting Alcohol from Garbage Would Conserve Vast Quantities of Grain and Potatoes.* (13) June 14.
Warm-Air System for Illinois Church.* (101) June 15.
House Refuse: Its Calorific Value and Its Possibilities. Reginald Brown. (Paper read before Inst. of Municipal Engrs.) (104) Serial beginning June 15.
The Activated Sludge Process at Worcester.* (104) June 15.
Specifications for Domestic Carbage Incinerators.* Curtis C. Myers. (83) June 15.
Operation and Use of Damper Regulators.* (101) Serial beginning June 22.
Direct Steam Radiation Heats Machine Shop.* (101) June 22.
New Plumbing System Tried in Chicago.* (101) June 22.
Radiators Supplied from Warm Air Furnace.* (101) June 29.
Modern Sewage Purification Works—Design, Construction and Management. Charles Terry. (Paper read before Assoc. of Managers of Sewage Disposal Works.) (104) June 29.
L'Epuration des Eaux d'Egout; la Décantation. H. Verrière. (43) Jan.

Structural.

Novel System of Foundations Used in Connection With the Federal Legislative Palace, Mexico City.* S. Fortin. (5) Jan.-June, 1916.
Reinforced Concrete Beams Reinforced For Compression.* Leonard C. Urquhart. (36) April.
Dundee Housing Schemes.* Jas. Thomson. (Abstract of a Report.) (104) April 13.
A National Housing Policy. (104) April 20.
Standard Unit Construction for Steel Frame Structures.* (12) Apr. 20.
Steel Sheet Piling: American Practice.* (11) Apr. 20.
A New Vickers Machine Gun Shop.* (11) April 27.
Making and Buying Sheet and Strip Stock.* F. Walter Guibert. (Paper read before Steel Treating Research Club, Detroit, Mich.) (62) May; (116) May.
Impact Tests and Their Relation to Others.* Howard J. Stagg, Jr. (116) May.
Some Slow Volume Changes in Portland Cement. Edward D. Campbell. (67) May.
Artistic Stucco. John B. Orr. (Paper read before the Amer. Concrete Inst.) (67) May.
Concrete Swimming and Wading Pools.* (67) May.
Construction of Vitrified Pipe Lines.* J. F. Springer. (60) May.
Impact Tests.* Sir Robert Hadfield. (Discussion of address by Howard J. Stagg, Jr., before Steel Treating Research Club, Detroit.) (62) May.
Report on Heat-Insulating Materials.* (From tests by Messrs. Sargent and Lundy, Consulting Engineers.) (64) May 1.
Effect of Water on Concrete.* Duff A. Abrams. (From *Concrete Highway Magazine.*) (86) May 2; (67) May; (104) May 25.
Construction Features of the Canal Shops at Balboa.* (72) May 3.

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New England Steel Bar and Wire Plant.* (20) May 3.
Alloy or Carbon Steels *versus* Carbonized. E. F. Lake. (Paper read before the Steel Treating Research Club, Detroit, Mich.) (20) May 3.
Concrete Consistency Measured by Simple Field Test.* Harold A. Thomas. (13) May 3.
The Standardisation of Engineering Materials and Its Influence on the Prosperity of the Country. Sir John Wolfe Barry. (James Forrest Lecture delivered at Inst. of Civ. Engrs.) (11) May 4; (Abstract) (12) May 4; (Abstract) (47) May 11.
Piling For Excavating Purposes at the Dalmarnock Electrical Power Station.* C. B. Sneddon. (Abstract of Paper read at Nat. Assoc. of Colliery Managers.) (22) May 4.
Three-Section Shield a Feature of Fifth Ave. Tunnel Project (for Street Traffic.)* (13) May 10.
Explanation of the Failures of Materials.* W. Knight. (72) May 10.
Twin Mixer Plant Places Five Thousand Yards of Winter Concrete Each Month.* (13) May 10.
A Method of Proportioning Materials for Concrete. H. C. Johnson. (Abstract of Paper read before Concrete Inst.) (104) May 11.
Researches Made Possible by the Autographic Load-Extension Indicator.* W. E. Dalby. (Lecture before the Inst. of Metals.) (12) Serial beginning May 18; (11) May 18.
Timber Decay. C. J. Humphry. (19) May 19; (104) June 22.
Distribution of Pressure in Earth Due to Concentrated External Load.* R. B. Fehr. (86) May 23.
Graphical Analysis of Stresses in Complex Column Sections.* W. S. Wolfe. (86) May 23.
Five Organizations Build Vast Steel-Plant Extension, Sparrow's Point, Md.* (13) May 24.
Winnipeg Sub-Surface Formation and Suitable Heavy Foundation Types. J. Q. Rankin. (96) May 24.
Weak Flat-Slab Concrete Building Strengthened by Adding New Steel and Wood Frame.* Maurice C. Couchot. (13) May 31.
Can the Farm Barn Be Made Absolutely Fireproof? W. G. Kaiser. (Paper presented before Am. Soc. of Agricultural Engrs.) (76) June 5.
Accidents on Construction—What They Cost and How to Prevent Them.* J. J. Rosenthal. (13) June 7.
Seven-Day Sand Tests No Criterion for Six-Month Tests. L. R. Brown (13) June 7.
Making Sheet Metal Trim for Buildings.* (101) June 8.
Girderless Reinforced-Concrete Floor System Has Straight-Bar Reinforcement.* (13) June 14.
Designing Methods for Straight-Bar System of Flat Slabs.* John Nydegger. (13) June 14.
Steel Plant Enlarged Under Difficulties.* (13) June 14.
Proposes New Specification for Deducting Rivet Holes.* D. B. Steinman. (13) June 14.
Design of Buildings in Mining Towns.* R. H. Hamill. (Paper read before West Virginia Coal Mining Inst.) (45) June 16.
Utilizing "Oversize" to Increase Output of Small Gravel Plants.* (86) June 20.
Invar et Aciers au Nickel Similaire.* F. Schwers. (93) Jan.
Pièces à Flexion Simple en Béton Armé; Determination de la Fibre Neutre par la Balance et du Travail par le Pendule.* M. Butavand. (43) March.
La Reconstruction dans les Régions Envahies.* G. Espitallier. (33) Serial beginning May 12.
Méthode Rapide de Calcul des Lignes d'Influence d'Arcs Prismatiques Surbaissés à Deux Encastrements.* G. Magnel. (33) May 26.
La Fixation des Chaises et des Consoles dans les Constructions en Béton Armé.* C. Lemaire. (33) June 30.
Wilhelm Ritters Bedeutung für die Neuere Baustatik.* Arnold Mauser. (107) April 14.
Stützmauer aus Eisenbeton für eine fahrbare Kohlenverladebrücke.* (107) June 9.
Die Elektrolyse als Schutz gegen die Corrosion von Metallen. (107) June 30.

Water Supply.

The Rules and Regulations of the Province of British Columbia Relating to the Annual Rental Fees of Water Powers. E. Davis. (5) Jan.-June, 1916.
Principles of Conservation as Applied to Water Power. Gifford Pinchot. (Address delivered before Engrs. Soc. of Penn.) (98) Nov.-Dec., 1916.
Some Problems of the Waterworks Executive. Garrett O. House. (Abstract of paper read before Minnesota Section of Am. Water Works Assoc.) (96) Mar. 22.

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Water Supply.

Water Supply—(Continued).

Planning the Distribution of the Water Supply of a Small Town. M'Kean Maffitt. (96) Mar. 22.
Pitting of Water Turbines and Their Design.* S. J. Zowski. (4) April.
Coolgardie Water Supply, Western Australia. P. V. O'Brien and J. Parr. (Abstract of paper read before Inst. of C. E.) (104) April 13.
Cement Joints For Cast-Iron Water Mains.* Clark H. Shaw. (Abstract of paper read before Am. Soc. Civ. Engrs.) (104) April 20.
The Horsley and Nicholson Automatic Compound Syphon.* George R. Nicholson. (Paper read before North of England Inst. of Mining and Mech. Engrs.) (57) Apr. 20; (106) May.
Flow Through Sharp Edged V-Notches or Weirs.* E. W. Doebler and F. H. Rayfield. (36) May.
China Mills Dam and Sluiceway of Suncook Mills.* Arthur T. Safford. (109) May.
Weir Meters for the Power Plant.* (64) May 1.
Salt Test for Flow Works Well in Infiltration Gallery. (13) May 3.
New Water-Works at Providence, R. I., to Cost $12 000 000.* Frank E. Winsor. (13) May 3.
Multiple Inspirators Aërate Algae-Laden Lake Supply.* (13) May 3.
New Reservoir and Water Mains Improve Service at Covington, Va.* Harry Stevens. (13) May 3.
Night-Rate Consumption Barometer in 100% Metered City.* (13) May 3.
Growth of Filter Sand at Three Water-Softening Plants. (13) Serial beginning May 3.
Marine Type of Diesel Engine Adapted to Water-Works.* Thomas Orchard Lisle. (13) May 3.
How to Lay Out Field Work and Keep Office Records on Earth-Dam Construction.* Selden P. Sears. (13) May 3.
Water Supply in the Killarney Rural District. (104) June 8.
Carbon Dioxide and Iron in Water Supplies.* C. G. Wigley and P. N. Daniels. (86) May 9.
Construction Features of Concrete Dam For Ottumwa, Ia., Water Works.* (86) May 9.
The Work of the Service Force of the Water Works Department of Minneapolis. J. A. Jensen. (86) May 9.
Method of Subirrigation in the Sanford District, Florida.* F. W. Stanley. (Abstract of *Bulletin* of U. S. Department of Agriculture.) (86) May 9.
Power Carried 548 Miles From Hydro-Electric Station Working on Both 1 247- and 1 777-Foot Heads.* (13) May 10.
Value of Racine Water-Works Fixed at $1 015 000. W. E. Miller. (13) May 10.
Silt Settled from Power Stream to Prevent Turbine Erosion. J. W. Swaren. (13) May 10.
Figuring Sizes of Hot Water Storage Tanks. C. F. Herington. (101) May 11.
Ground Ice and Water Supplies.* James MacAlister. (11) May 11.
Unlined Earth Reservoirs For Pumping Plants.* (111) May 15.
Economic Devices in a Small Hydraulic System.* J. W. Swaren. (111) May 15.
Wrestling with Filter Bottom Troubles at Minneapolis Plant. Lewis I. Birdsall. (13) May 17.
New Design of Screen Chamber.* John H. Lance. (13) May 17.
The Bombay Hydro-Electric Power Scheme.* (12) Serial beginning May 18.
Water Supply Standards. William J. Orchard. (Paper read before Chemical and Bacteriological Section of the Am. Water Works Assoc.) (96) May 24.
South American Rainfall Reverse of Northern Pacific. C. G. Newton. (13) May 24.
Making the B. Coli Test Tell More. Milton F. Stein. (13) May 24.
Water-Filtration Plants in the United States and Canada in 1917. (13) May 24.
Notes on the Construction of Turbine Pumps.* Alan E. L. Chorlton. (12) Serial beginning May 25; (11) Serial beginning May 25.
Report on Enlargement of Montreal Aqueduct.* H. C. Vantelet, Arthur St. Laurent and J. B. McRae. (96) Serial beginning May 31.
Montreal Water and Power Company's Chlorine Cell Installation. Frank Henry Pitcher and James O. Meadows. (96) May 31; (13) May 24.
One Engineer's Opinion as to Why the Standley Lake Dam Sloughed.* A. Lincoln Fellows. (13) May 31.
How Standley Lake Dam Was Built and the Story of the Slips.* John E. Hayes. (13) May 31.
Deadlock on Cast-Iron Pipe Specifications. (13) May 31.
The Weather Business.* George S. Bliss. (2) June.
Los Angeles Power Development.* (60) June.
Elimination of Corrosion in Hot-Water Supply Lines.* F. N. Speller. (Abstract of paper read before Am. Soc. of Heating and Ventilating Engrs.) (47) June 1; (64) June 19.
Rock Creek Multiple Arch Dam.* R. A. Monroe. (111) June 1.
Failure of Hydraulic Projects From Lack of Water Prevented by Better Hydrology. Robert E. Horton. (13) June 7.

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Water Supply—(Continued).

Water Supply—(Continued).

House Tanks for Modern Buildings.* Harold L. Alt. (101) June 8.
Experiments on Removal of Iron From Water Supply of Springfield, Ill. G. C. Hobermeyer. (Abstract from paper presented before Illinois Public Health and Welfare Assoc.) (86) June 13.
Determining Daily Discharge of Irrigation Canals Affected by Check Control.* H. W. Humphrey. (86) June 13.
Service Charges—How Constituted. J. N. Chester. (Abstract of paper read before the Four-State Section of the Am. Waterworks Assoc.) (86) June 13.
The Design of a Tower for a 50 000-Gallon Hemispherical Bottom Tank.* (96) June 14.
Overcoming Practical Problems in Mechanical Water-Filter Operation. Lewis I. Birdsall. (Abstract of Paper read before American Water-Works Assoc.) (13) June 14.
Overhaul in Irrigation Canal Construction. Charles W. Helmick. (86) June 20.
Why Hydroelectric Development Lags.* Hugh L. Cooper. (27) June 23.
Standardization of Cast-Iron Pipes. Wm. Matthews, F. J. Bancroft, and P. H. Palmer. (Report presented to Inst. of Water Engrs.) (104) June 29.
Au Sujet de la Distribution des Vitesses dans les Tuyaux.* M. Butavand. (43) Jan.
Mesure des Débits, le Jaugeur Venturi.* L. Camichel, D. Eydoux et J. Lhériand. (43) Mar.
Barrage à Arches Multiples en Béton Armé sur la Sélune (Manche).* Auguste Pawlowski. (33) May 12.
L'Usine Hydro-Electrique de la Tallassee Power Co. sur la Yadkin River (North Carolina, E.-U.); Turbines, Hydrauliques de 31 000 Chevaux.* P. Calfas. (33) June 16.
Die Wasserkraftanlagen Tremp und Seros der Barcelona Traction, Light & Power Co.* A. Huguenin. (107) Serial beginning April 7.
Bericht über neue Geschwindigkeits-Regulatoren, Modell 1916, von Escher Wyss & Cie., Zürich. Franz Prásil. (107) Serial beginning May 26.
Der Anstich des Ritomsees.* (107) May 26.
Bestimmung des Wirkungsgrades einer Wasserkraftwerk-Entsandungsanlage.* J. Büchi. (107) June 23.

Waterways.

The Rangoon River-Training Works.* Sir George Cunningham Buchanan. (63) 1915-1916, Pt. II.
Economic and Strategic Aspects of Enlargement of Welland Canal and of Construction of Georgian Bay Ship Canal. R. W. Leonard. (5) Jan.-June, 1916.
Further Progress of the Miami Conservancy District, of Ohio. Kenneth C. Grant. (98) Nov.-Dec., 1916.
Multiple-Arch Dams.* L. R. Jorgensen. (Abstract of paper read before Am. Soc. C. E.) (104) Serial beginning April 27.
Nyhohn System of Lock Operation.* George Bendixen. (100) May-June.
Improvement of Mississippi River from Winona to La Crosse.* W. A. Thompson and H. M. Anderly. (100) May-June.
Construction of North Guide Wall of Troy Lock.* John J. McCabe. (100) May-June; (Abstract.) (86) May 23.
Improving the Ohio River below Pittsburgh, Pa.* J. C. Oakes. (100) May-June.
Cofferdam for New Locks at St. Mary's Falls Canal, Sault Ste. Marie, Mich.* W. J. Graves. (100) May-June; (86) June 20.
I-Beams Forming Main Verticals of Bulkhead. Make Hard Driving into Limestone.* Herbert D. Mendenhall. (13) May 10.
Sluicing Silt to Reduce Canal Leakage.* Fred. J. Barnes. (13) May 17.
Ohio Flood-Control Dam has Duplex Outlets.* (13) May 24.
Pennsylvania Export Pier at Baltimore.* (15) May 25.
New Ocean Terminals at Halifax.* A. C. Brown. (Abstract of Paper read before Canadian Soc. of C. E.) (18) Serial beginning May 26.
River Front Improved Without Cost to Taxpayers (Davenport, Iowa).* (13) June 7.
Concrete Lock Paving Done First in Rapid Construction of Ohio River Dam 35.* George W. McAlpin. (13) June 14.
Lake Shore Protection at Chicago Being Built of Concrete.* M. D. Blumberg. (13) June 14.
Diking Electrically in the Northwest.* R. M. Boykin. (Paper presented before Portland Sections of N. E. L. A. and A. I. E. E.) (111) June 15.
A Departure in the Design of Export Coal Piers.* (15) June 15.
Importance of Good Foundations for Levees. W. G. Caples. (86) June 20.
Le Tunnel Sous-Marin entre la France et l'Angleterre.* A. Moutier. (92) March.
Les Ports Français et la Guerre, Caen-Ouistreham et les Hauts Fourneaux de Caen.* Auguste Pawlowski. (33) April 28.
Les Ports Français et la Guerre, Honfleur et Saint Malo.* Auguste Pawlowski. (33) June 2.

* Illustrated.